Exabyte 440 and Exabyte 480 Libraries

Installation and Operation

Exabyte®

302539-005

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Note: The most current information about this product is available at Exabyte's web site (www.exabyte.com).

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302539-005

Revision History

Revision	Date	Description
000	July 1994	Beta
001	October 1994	Initial release
002	February 1996	Beta for the Exabyte Mammoth tape drive
003	March 1996	Initial release for Exabyte Mammoth tape drive
004	July 1997	Exabyte 440 and Exabyte 480 support for Eliant 820 tape drive
005	June 1999	Added LVD SCSI information

Revisions to This Manual

This revision of *Exabyte 440 and Exabyte 480 Libraries Installation and Operation* (005) contains the following changes and enhancements:

- Added low-voltage differential (LVD) SCSI information.
- Removed information about the Exabyte 8505 tape drive.
- Added BSMI information.
- Rearranged the chapters.

Safety Agency Standards

The Exabyte 440 and Exabyte 480 comply with the following domestic and international product safety standards:

- UL Standard 1950, 3rd Edition, Information Technology Equipment Including Electrical Business Equipment
- CSA Standard C22.2 No. 950-95, Safety of Information Technology Equipment Including Electrical Business Equipment
- IEC 950/EN60950, Safety of Information Technology Equipment including Electrical Business Equipment

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded cables are required for this device to comply with FCC Rules. **Use shielded cables when connecting this device to others.**

According to FCC regulations, changes or modifications to this equipment that are not expressly approved by Exabyte could void the user's authority to operate the equipment.

Industry Canadian Notice per ICES-003

English This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

French Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

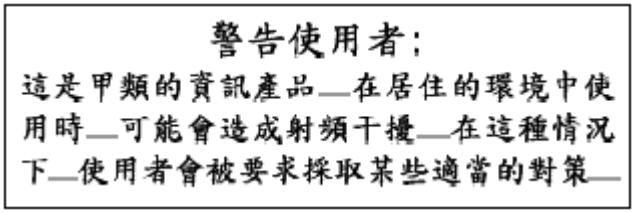
European Notice

This equipment has been tested and complies with the following requirements:

- EN 55022 / CISPR 22, Class A
- EN 50082-1: 1992

Bureau of Standards, Metrology, and Inspection (BSMI) – Taiwan

This equipment has been tested and complies with CNS C6357.



English Warning! This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

Australia/ New Zealand

This equipment has been tested and complies with AS/NZS 3548.

Product Warranty Caution

The Exabyte® 440 and Exabyte 480 Libraries are warranted to be free from defects in materials, parts, and workmanship and will conform to the current product specification upon delivery. **For the specific details of your warranty, refer to your sales contract or contact the company from which the library was purchased.**

The warranty for the library shall not apply to failures of any unit when:

- The library is repaired by anyone other than Exabyte's personnel or approved agent.
- The library is physically abused or is used in a manner that is inconsistent with the operating instructions or product specification defined by Exabyte.
- The library fails because of accident, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, modification, or service by anyone other than the factory service center or its approved agent.
- The library is repaired by anyone, including an approved agent, in a manner that is contrary to the maintenance or installation instructions supplied by Exabyte.
- Exabyte's serial number tag is removed.
- The library is damaged because of improper packaging on return.

CAUTION

Returning the library in unauthorized packaging may damage the unit and void the warranty.

If problems with the library occur, contact your maintenance organization; do not void the product warranty by allowing untrained or unauthorized personnel to attempt repairs.

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Notes

About this manual

Use this manual to install, configure, operate, maintain, and diagnose problems with your library.

Conventions used in this manual

This manual uses the following conventions:

Enter Boxed text indicates keys on the operator panel.

Note: Notes provide hints or suggestions about the topic or procedure being discussed.

➤ **Important** Information next to the heading "Important" helps you complete a procedure or avoid extra steps.

CAUTION

Boxed text under the heading "CAUTION" provides information you must know to avoid damaging the library or tape drives or losing data.

WARNING!

Boxed text under the heading "WARNING!" provides information you must know to avoid personal injury.

Related publications

For information about these libraries, the tape drives, and the standards used by these libraries, refer to the following publications.

Note: Exabyte technical publications are available on the Support Services section of the Exabyte web site (www.exabyte.com).

Exabyte 440 and Exabyte 480 libraries

- *Exabyte 440 and Exabyte 480 8mm Libraries Product Specification*, 302538
- *EXB-440 and EXB-480 8mm Libraries SCSI Reference*, 302541
- *Exabyte 440 and Exabyte 480 8mm Libraries Maintenance*, 302542
- *Exabyte 440 and Exabyte 480 8mm Libraries Planning for Integration*, 302543
- *Exabyte 440 and Exabyte 480 Illustrated Parts Catalog*, 302544
- *Exabyte Bar Code Label Specification for 8mm Cartridges*, 308607

Exabyte Mammoth 8mm tape drive

- *Exabyte Mammoth Product Specification,* 306482
- *Exabyte Mammoth SCSI Reference,* 306483
- *Exabyte Mammoth Installation and Operation,* 306484

Eliant 820 8mm tape drive

- *Exabyte Eliant 820 Product Specification,* 316593
- *Exabyte Eliant 820 SCSI Reference,* 316869
- *Exabyte Eliant 820 Installation and Operation,* 317209

Standards

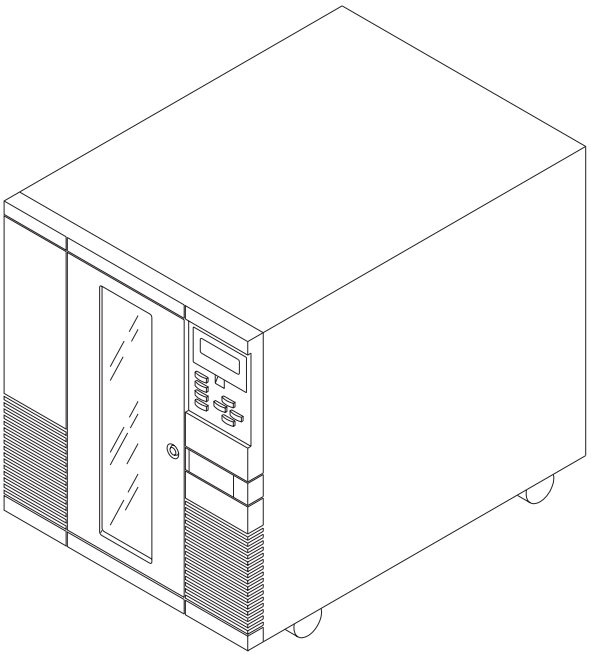
- *ANSI Small Computer System Interface-2 (SCSI-2),* Z3.131-1994

- *ANSI Small Computer System Parallel Interface-2,* X3T10 / 1142D

Notes

1 Welcome

Congratulations on selecting the Exabyte® 440 or Exabyte 480 Library (EXB-440 or EXB-480). Your new library provides automated data storage, archiving, backup, and retrieval for mid-range and high-end workstations, servers, and networks.



The library's robotic cartridge handling mechanism (CHM) responds to commands from the host application to move data cartridges between tape drives and storage slots, while the tape drives read and write data. You can insert and remove cartridges through the entry/exit port without opening the library door.

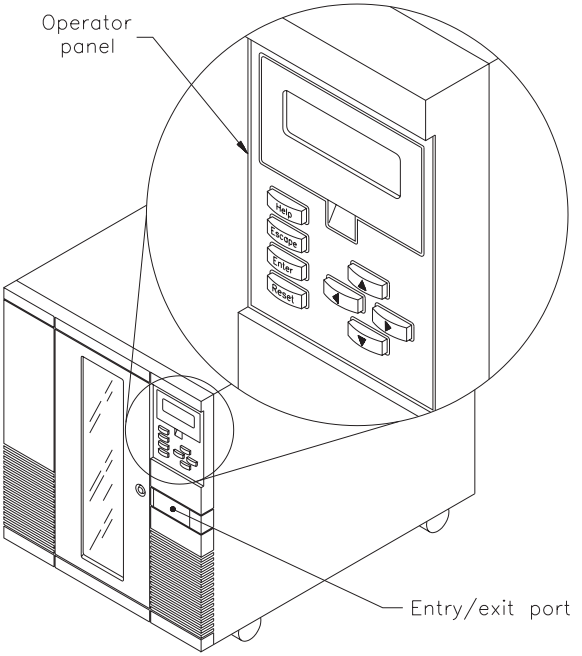
About the Exabyte 440 and Exabyte 480

The following illustrations and descriptions summarize the important library features. For library specifications, refer to the *Exabyte 440 and Exabyte 480 8mm Libraries Product Specification*.

The Exabyte 440 contains 40 data cartridge slots, while the Exabyte 480 contains 80 data cartridge slots. Both libraries can contain up to four Exabyte Mammoth tape drives or four Eliant 820 tape drives.

The library is available in narrow or wide, single-ended, low-voltage differential (LVD), or high-voltage differential (HVD) SCSI configurations. The narrow SCSI library contains either Mammoth or Eliant 820 tape drives and operates on up to four SCSI buses. The wide SCSI library contains Mammoth tape drives only and operates on up to five SCSI buses.

Front panel components



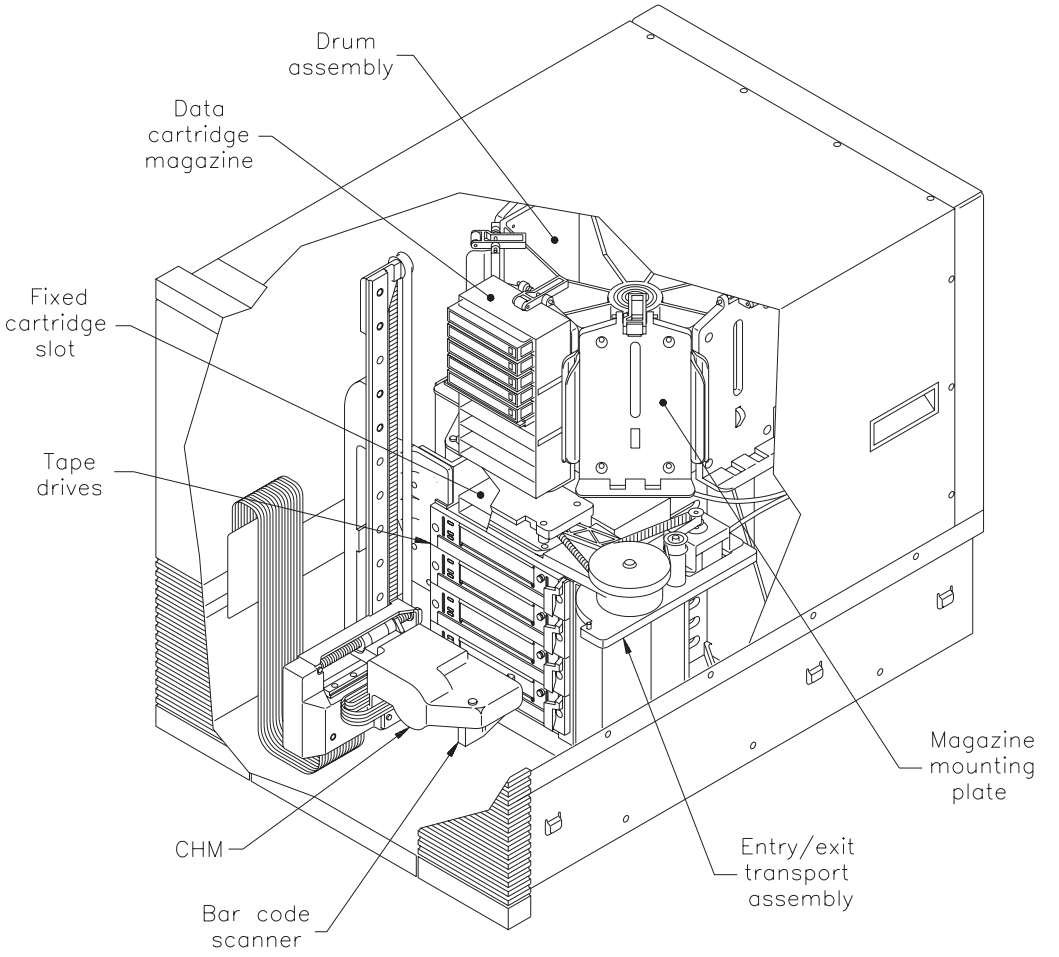
Operator panel

The operator panel includes a four-line liquid crystal display (LCD) and a keypad. Use the operator panel to access menu options used to configure the library and monitor operations. If necessary, you can tilt the LCD for easier viewing.

Entry/exit port

The entry/exit port allows you to insert or remove individual cartridges from the library without opening the door.

Internal components



Drum assembly

The drum assembly holds the data cartridge magazines and rotates 180 degrees in either direction to position the magazines in front of the CHM.

Data cartridge magazines

Data cartridge magazines are the removable carriers for the data cartridges. The magazines snap onto mounting plates on the library's rotating drum assembly and allow easy removal and replacement of cartridges. Each magazine has individual cartridge slots for ten 8mm cartridges. The Exabyte 440 contains up to four data cartridge magazines; the Exabyte 480 contains up to eight.

Fixed cartridge slot

The fixed cartridge slot, located directly above the tape drives, allows you to store an 8mm cleaning cartridge or an additional 8mm data cartridge.

Tape drives

The library can accommodate up to four of the following 8mm tape drives:

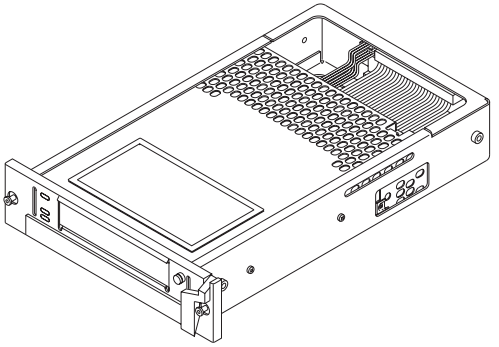
- Mammoth with a wide SCSI configuration
- Mammoth with a narrow SCSI configuration
- Eliant 820 with a narrow SCSI configuration

➤ **Important** You cannot combine Exabyte Mammoth tape drives with any other type of tape drive in the same library.

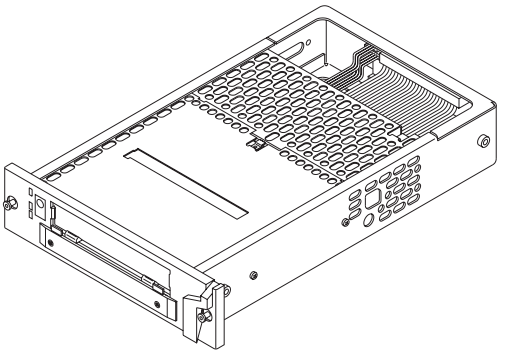
Drive carrier When you purchase the library, each tape drive in the library is fitted inside a drive carrier. The drive carrier allows you to slide the drive in and out of the library if the tape drive needs repair or if you are adding new tape drives.

Because the tape drives have different faceplates, there are different drive carriers for Mammoth tape drives and Eliant 820 tape drives, as shown below. Because of the different SCSI connectors, there is a third drive carrier for Mammoth wide SCSI tape drives (not shown).

Note: You must purchase the tape drive pre-installed in the drive carrier.



Mammoth drive carrier



Eliant 820 drive carrier

Drive blank Drive blanks are “empty” drive carriers with solid faceplates. If you plan to operate the library with fewer than four tape drives, you must install drive blanks in the empty drive positions. The drive blanks ensure correct airflow through the library for cooling, compliance with EMI regulations, and in some configurations, correct SCSI connection.

There are two types of drive blanks to match the different SCSI configurations: wide SCSI and narrow SCSI.

Cartridge handling mechanism (CHM)

The cartridge handling mechanism (CHM) moves cartridges between cartridge slots, tape drives, and the entry/exit port.

Bar code scanner

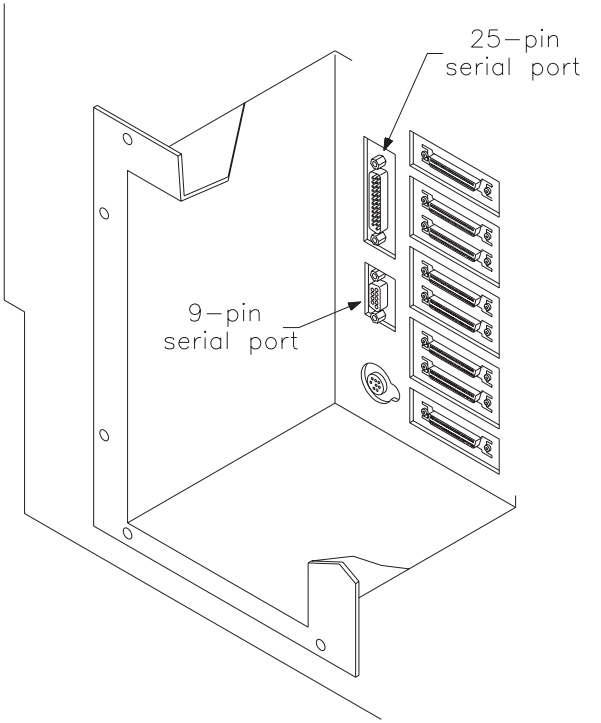
The high-speed bar code scanner, mounted on the CHM, reads bar code labels affixed to the cartridges to track individual cartridges. Cartridge label information becomes part of the library’s cartridge inventory stored in nonvolatile RAM.

Entry/exit transport assembly

The entry/exit transport assembly moves the transport arm to and from the entry/exit port to pick up cartridges.

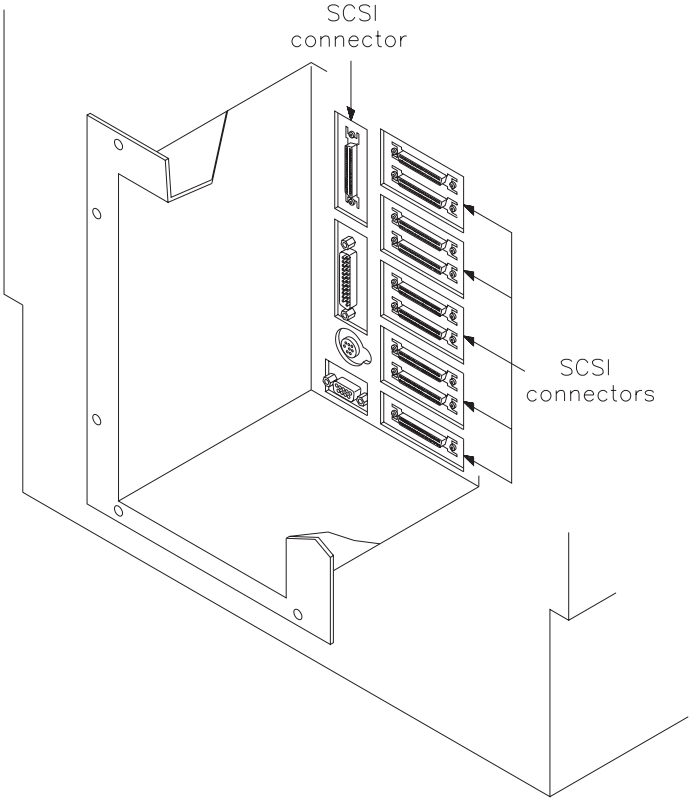
Serial ports

Two serial ports (25-pin and 9-pin) at the back of the library allow you to communicate with the tape drives and the library across a serial cable connected to an external computer. By running a special diagnostic program, you can perform diagnostics, upgrade firmware, and test CHM motion.



SCSI connectors

The library has either eight or ten SCSI connectors, accessible through the cabling bay on the back. Narrow SCSI libraries have eight connectors and can be connected to up to four SCSI buses (the tape drive in the uppermost slot and the library are on the same bus). Wide SCSI libraries have ten connectors and can be attached to up to five SCSI buses (all four tape drives and the library can be on separate buses).



Contacting Exabyte

To obtain technical support	
Exabyte Technical Support	1-800-445-7736
	1-303-417-7792
	1-303-417-7160 (fax)
e-mail	support@exabyte.com
World Wide Web	http://www.exabyte.com
To order supplies and accessories	
Exabyte Express	1-800-EXATAPE (1-800-392-8273)
	1-972-481-4221
	1-972-406-9081 (fax)
To return equipment for service	
Exabyte Service	1-800-EXATAPE (1-800-392-8273)
	Scotland: + 44-1324-564564
e-mail	service@exabyte.com

Note: If it is more convenient to your location, contact Exabyte Technical Support in Europe at the following numbers:

Phone: + 31-30-254-8890
Fax: + 31-30-258-1582
BBS: + 31-30-258-1617

2 Hardware Installation

This chapter describes how to install and set up the library hardware.

Preparing for installation

Before installing the library, complete the following preliminary steps.

✔	Step	Description
	1	Unpack the library.
	2	Obtain accessories and equipment.
	3	Prepare the host computer.
	4	Prepare the library for installation.

Step 1 – Unpack the library

Complete the unpacking steps printed on the box. Save all original packing materials in case you need to ship or move the library later.

Step 2 – Obtain accessories and equipment

Make certain you have all the accessories and equipment for library operation, as indicated in the table below. Many of these items are included in the library accessories box (a separate box at the top of the carton).

Required accessories and equipment	
Power cord	Included with the library. (Page 147 provides power cord specifications for other voltages and international use.)
Two keys for the front door	Included with the library.
Jumpers for connecting the library and tape drives to a single SCSI bus.	Included with the library (three for narrow SCSI libraries and four for wide SCSI libraries).
Twelve screws and ten clip nuts (see page 17 for specific sizes)	Included with rack-mount libraries.
Two slide rails	
SCSI cables	If these items are not included with the library, contact Exabyte to purchase them. If you want to use your own, see page 148 for specifications. Visit the Exabyte web site (www.exabyte.com) for a list of approved vendors.
SCSI terminator(s) (required if the library or one of the tape drives is the last device on the bus)	
Data cartridges and cleaning cartridges	If cartridges are not included with the library, contact Exabyte to purchase them. If you want to use your own, refer to page 71 for appropriate data cartridges and to page 85 for appropriate cleaning cartridges.

➤ **Important** Your library has been shipped to you with the tape drives pre-installed. For libraries that will operate with fewer than four tape drives, drive blanks have been installed in the unused carrier slots. For more information, see "Using drive blanks" on page 140.

Step 3 – Prepare the host computer

Make sure your SCSI host bus adapter card or cards installed in the host computer and its application software are compatible with your library and the tape drives you are using. You can obtain software compatibility information for Exabyte products from Exabyte's web site (www.exabyte.com).

You can install the software application on the host computer before or after library installation. However, if you install the software first, you may need to reconfigure it for use with the library.

Step 4 – Prepare the library for installation

Prepare the library as follows:

- Ensure that the work area is free from conditions that could cause electrostatic discharge (ESD). Discharge static electricity from your body by touching a known grounded surface, such as your computer's metal chassis.

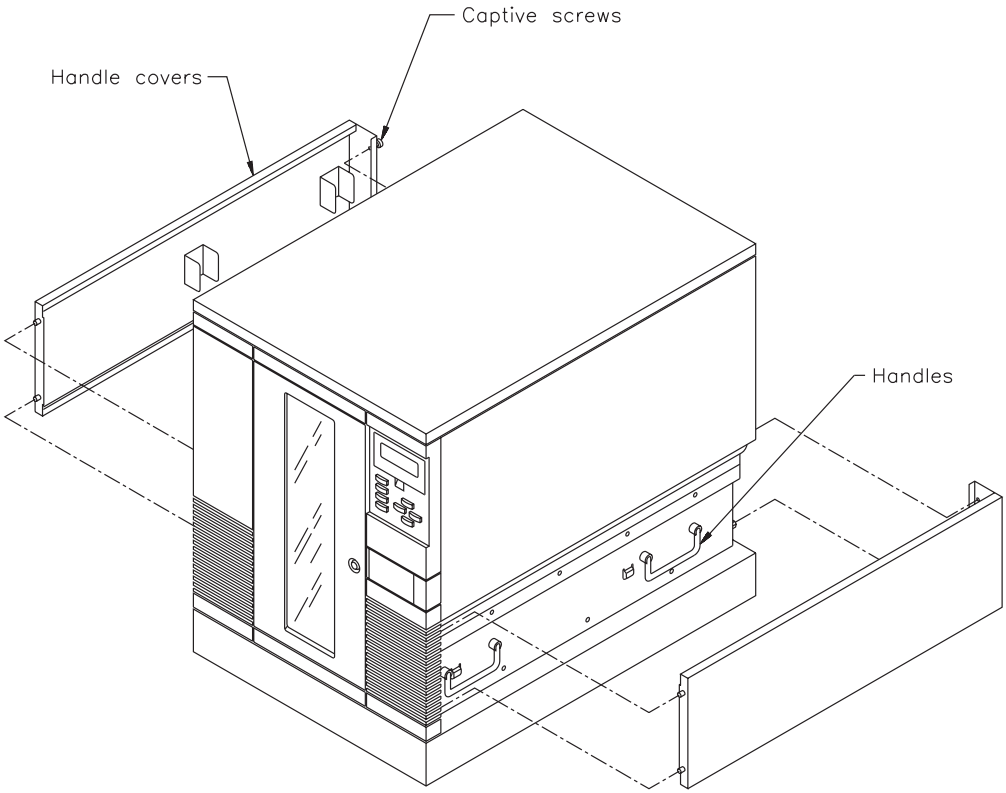
- Locate an appropriate area for the library. The library must have a level surface near a readily accessible outlet. In addition, there must be approximately 6 inches (15 cm) of open area behind the library for adequate air flow.

- If you have a rack-mount library, make sure that your rack has extension support legs and that you have at least four people or two people and a small fork lift to lift the library into the rack.

- If you have a standalone library, access the handles by removing the side panels as described below.

    - Using a flat-blade screwdriver, loosen the captive screws (two on each panel) at the rear of the library.

- Pull each side panel back and away from the library, as shown in the following figure.



Installing the library hardware

This section provides step-by-step instructions for installing the library hardware. Use the following table as a checklist.

✔	Step	Description
	1	If you have a rack-mount model, install the library into a rack.
	2	Unlock and open the door.
	3	Remove the packing foam.
	4	Prepare and install cartridges.
	5	Install the cartridge magazines.
	6	Install a cleaning cartridge.
	7	Close and lock the front door.
	8	Connect the library to the SCSI bus.
	9	Connect the power cord.
	10	Power on the library.

WARNING!

Before performing any installation or maintenance procedures, be sure that the library power switch is in the off position and that the power cord is disconnected from the library and the outlet.

Step 1 – Install the rack-mount library

If you have a rack-mount library, follow these instructions to install it into a standard EIA 19-inch rack. If you have a standalone library, go to "Step 2 – Unlock and open the door" on page 24.

WARNING!

The rack-mount library weighs 137 – 179 pounds (62 – 81 kg); the standalone library weighs 190 – 238 pounds (86 – 110 kg).

You need at least 4 people, or 2 people and a small fork lift, to lift either model.

Make sure you install the library in the lowest possible location in the rack and that the rack is equipped with extension support legs.

Make sure you extend the support legs before installing the library in the rack or when sliding it out of the rack. If you do not have extension support legs, use an additional person to counterweight the back of the rack or cabinet.

For this procedure, you will need the following:

- Standard EIA 19-inch rack equipped with extension support legs
- TORX screwdriver with a T-25 bit
- T-15 bit, if you need to extend the rails
- Eight 10-32 × 1/2 pan head screws
- Two 10-32 × 1.0 pan head screws
- Two 8-32 × 7/16 button head screws
- Ten clip nuts (provided in the accessory box), necessary if the rack does not have threaded holes
- Two slide rails (provided in the accessory box)

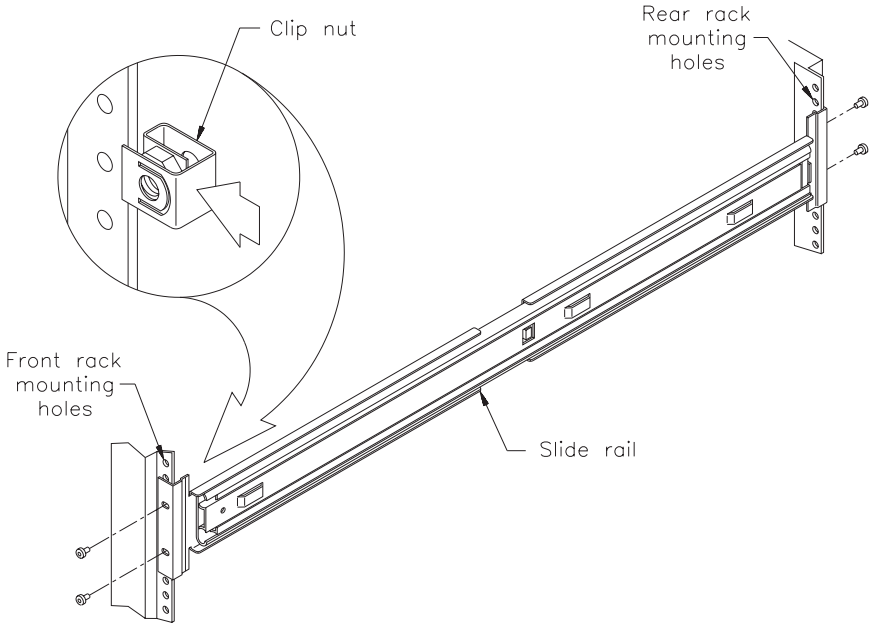
Installing the slide rails into the rack

To install the slide rails into the rack:

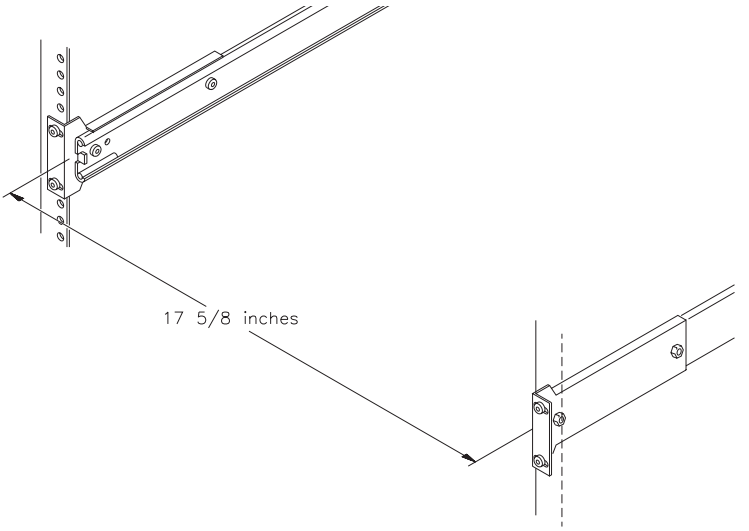
1. Locate the mounting holes on the rack where you want to install the library. Allow 1 to 2 inches (3 to 4 cm) minimum clearance below the bottom mounting hole.

   Note: If the rack does not have threaded holes, attach eight of the ten clip nuts over the holes (see the following figure).

2. Using a T-25 TORX driver and eight (four for each rail) 10-32 × 1/2 pan head screws, attach, but do not tighten, the slide rails to the rack (see the following figure).



3. Adjust the distance between the mounting brackets on each side of the cabinet to 17 5/8 inches (44.8 cm), as shown in the following figure. Measure both the front and the back.



4. Use a T-25 TORX screwdriver to tighten the screws to 12.0 in-lbs (13.8 kg-cm) of torque.

Installing the library into a rack

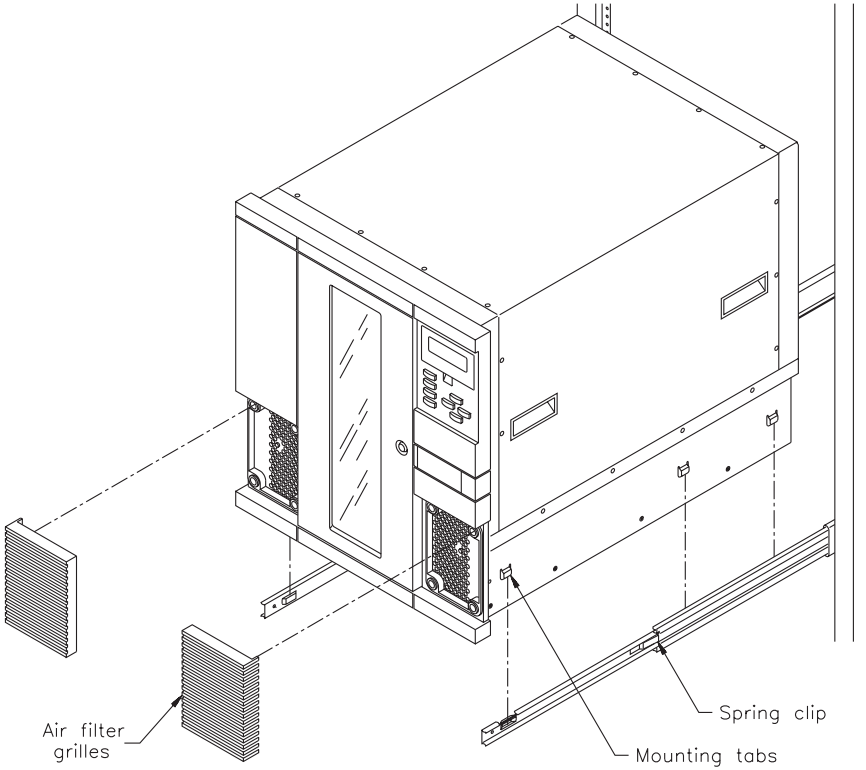
To install the library into a rack:

1. Extend the extension support legs on the rack.

2. Slide the inside rails as far out of the rack as possible (see the following figure).

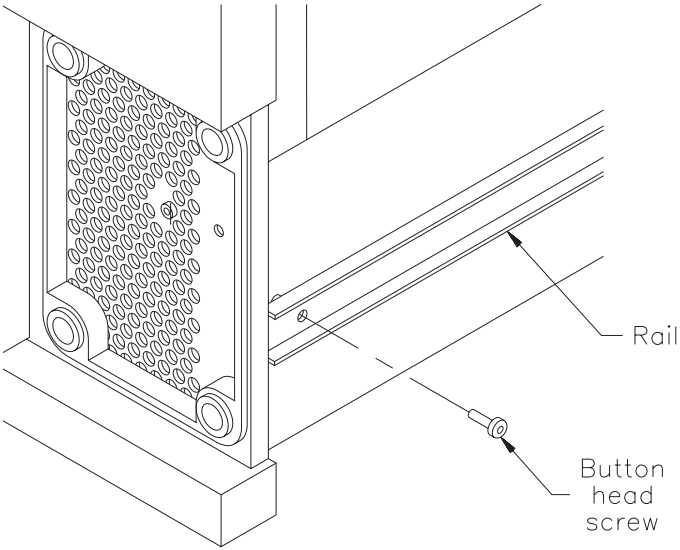
3. Remove the air filter grilles from the front of the library by lifting the outside edges and pulling the grilles away from the library (see the following figure).

4. Using four people, or two people and a fork lift, lift the library by the handles and lower it onto the slide rails so the mounting tabs on each side of the library fits into the slots in the rails (see the following figure). Make sure all six mounting tabs are fitted securely into the slots.



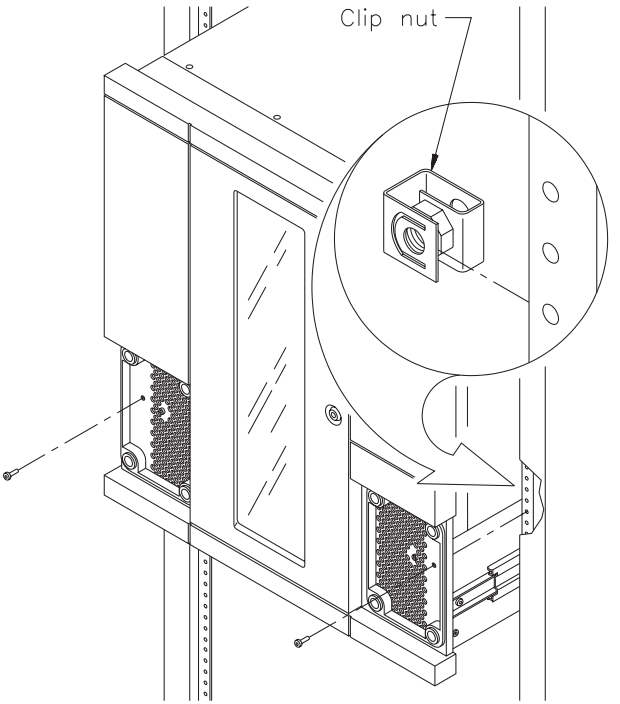
5. Press the spring clips and slide the library most of the way into the rack keeping the screw hole in the front of the slide rails accessible.

6. Install one 8-32 × 7/16 button head screw into the screw hole on each rail, as shown in the following figure.



7. If the holes in the rack are not threaded, install a clip nut on each side of the rack in line with the screw hole in the front panel of the library, as shown in the following figure.

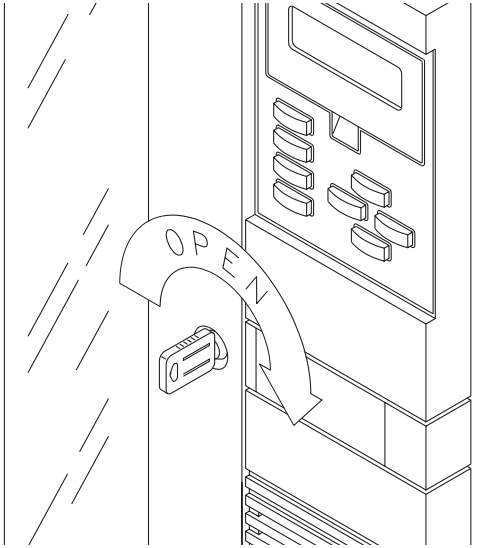
8. Slide the library completely into the rack. Using a T-25 TORX screwdriver, insert the two 10-32 × 1.0 pan head screws into the front panel, as shown in the following figure. These screws prevent the library from sliding out of the rack.



9. Replace the air filter grilles on each side of the front panel.

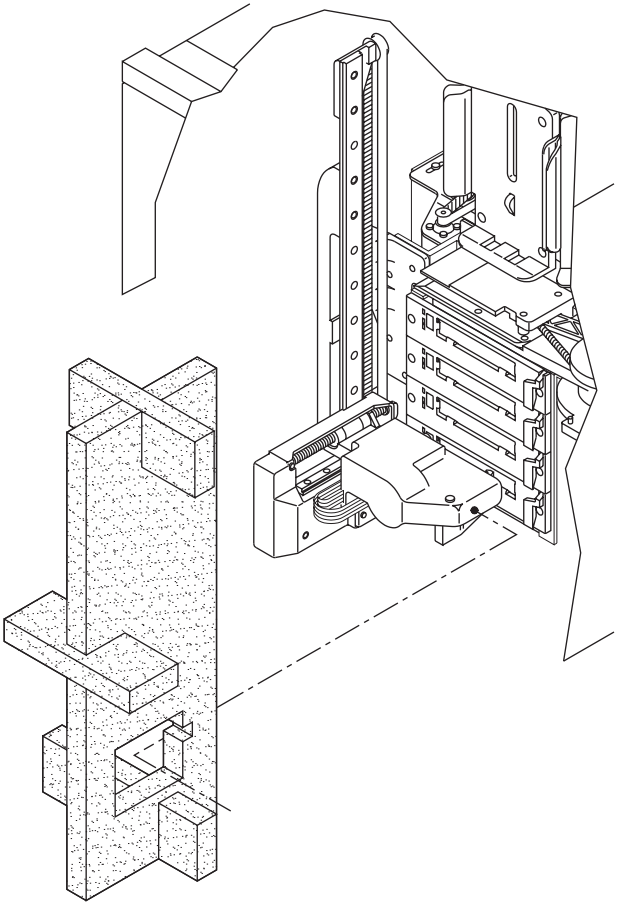
Step 2 – Unlock and open the door

To open the door, insert the key from your accessory kit into the lock, push in, and turn it one-quarter turn to the right, as shown in the following figure. Pull the door open.



Step 3 – Remove the packing foam

Remove the packing foam from the library as shown in the following figure.



Step 4 – Prepare and install cartridges

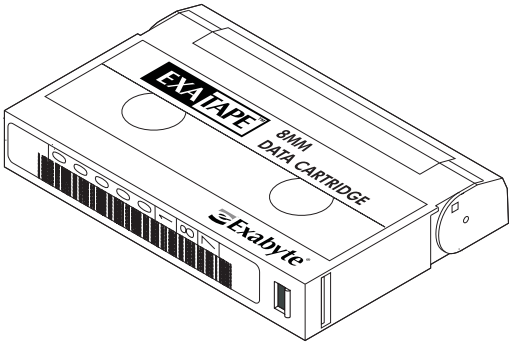
Two types of Exatape™ 8mm Data Cartridges are available: advanced metal evaporated (AME) and metal particle (MP). Exabyte Mammoth tape drives write and read AME tape and read, but do not write, MP tape. Eliant 820 tape drives write and read MP tapes, but do not support AME tape.

➤ **Important** Because of media management and application software issues, Exabyte recommends that you do not mix AME and MP data cartridges in the same library. If you must mix AME and MP cartridges, contact your application software vendor.

Always use Exabyte media to achieve the best tape drive performance. The tape drives are tested to specifications using Exabyte media at the factory.

To prepare and install cartridges:

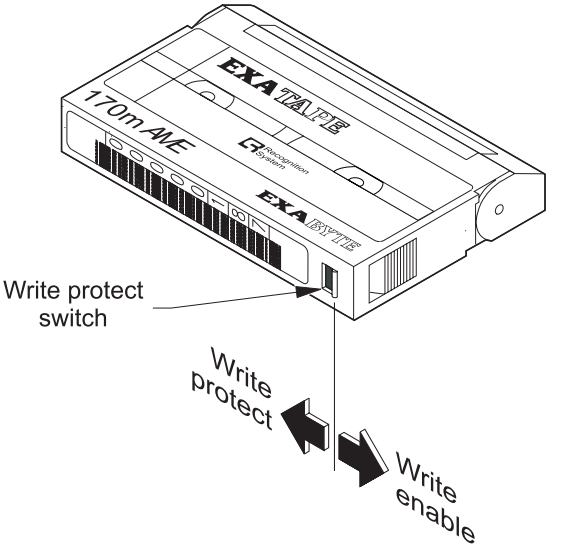
1. Affix a bar code label to each cartridge by positioning the label as shown in the following figure, using the recessed area on the cartridge for guidance. Make sure you orient the label correctly.



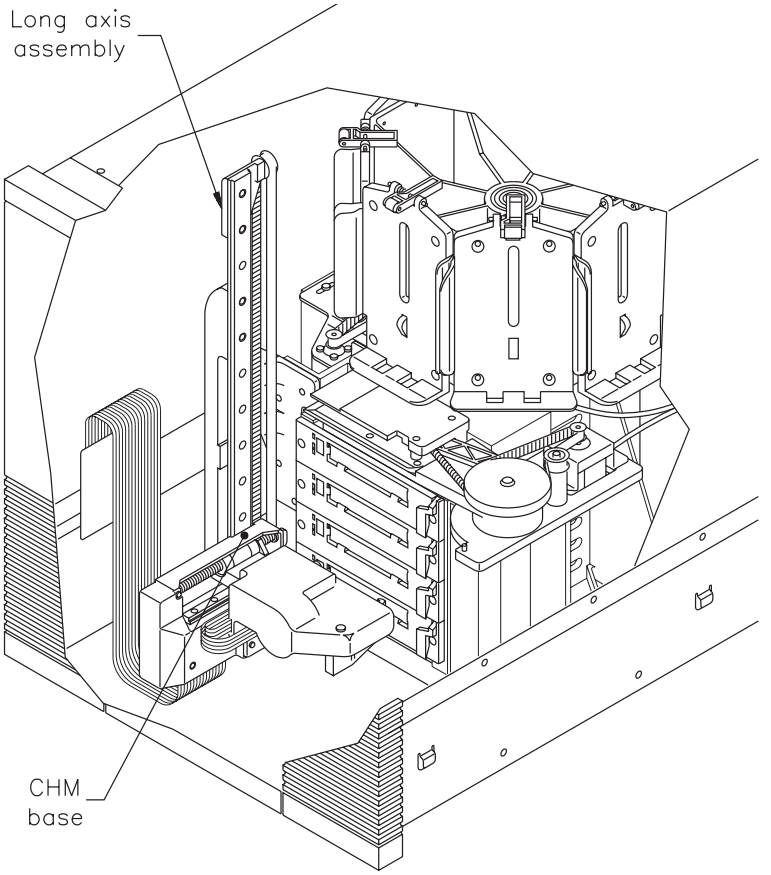
For information on how to prepare bar code labels, refer to the *Exabyte Bar Code Label Specification for 8mm Cartridges.*

➤ **Important** If you remove a bar code label from a cartridge without replacing it, make sure you clean the label area thoroughly. Bar code labels can leave adhesive on the label area, which may cause the cartridge to stick to the gripper.

2. Make sure the write-protect switches on the cartridges are set appropriately, as shown in the following figure. You can use a ball-point pen or similar instrument to move the write-protect switch. If the write-protect switch window is red, the cartridge is write-protected.



3. If necessary, move the cartridge handling mechanism (CHM) so it is not blocking the magazine mounting plates on the drum. To move the CHM, reach in through the door and push against the *base* of the CHM, sliding it firmly to the bottom of the long axis until it stops, as shown in the following figure.



➤ **Important** Do not touch the lens on the bar code scanner; smudges on the lens can cause scanning errors.

4. Remove the cartridge magazine by pulling it out first from the top and then the bottom.

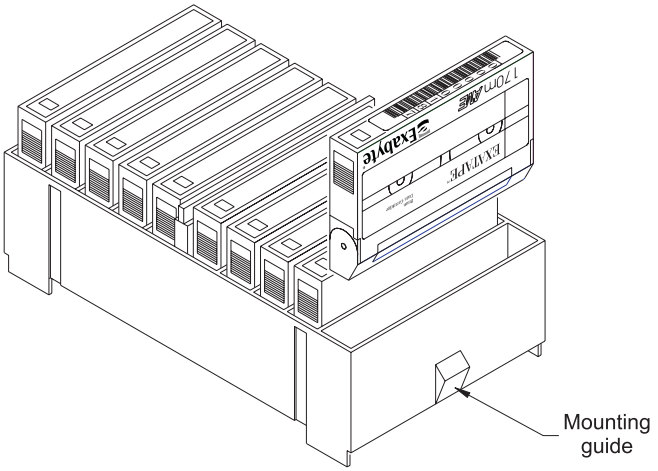
> **CAUTION**
>
> Make sure the CHM and cabling are safely out of the way before you remove or install the cartridge magazine.

5. Place the magazine on its feet with the single mounting guide toward the right, as shown in the following figure.

6. Position each cartridge so that the bar code label is on top and the write-protect switch is toward the front, as shown in the following figure.

7. Insert the cartridge into the magazine slot.

Note: Very little force is needed to install a data cartridge. If it does not snap into place easily or if it protrudes further than the magazine's center rib, check the orientation of the cartridge.



Step 5 – Install the cartridge magazines

➤ **Important** Use only magazines designed for Exabyte 440 and Exabyte 480 libraries. Do not use magazines designed for full-high Exabyte 8mm libraries.

Note: The Exabyte 440's four magazine mounting plates are installed on every other mounting plate position on the drum, with the mounting plate identifiers 0, 1, 2, and 3.

CAUTION

Make sure the CHM and its cabling are safely out of the way before you remove or install the cartridge magazines.

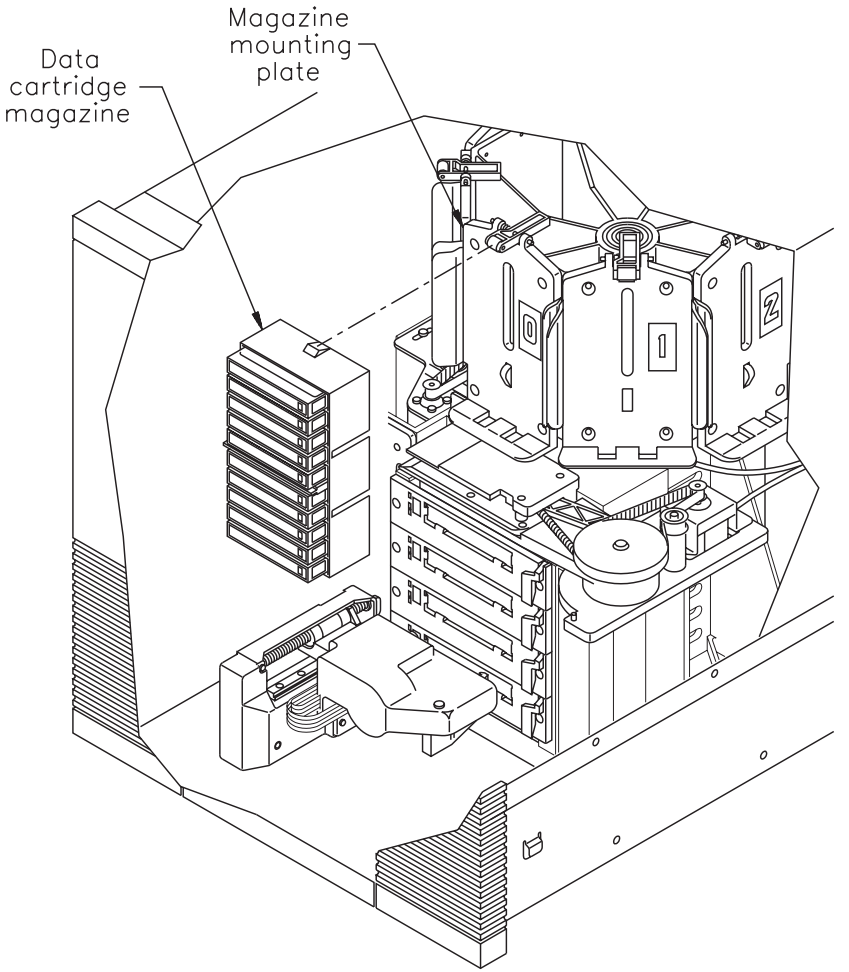
To install a cartridge magazine:

1. If necessary, manually rotate the drum to access the mounting plate where you want to install the magazine.

2. On the magazine mounting plate, locate the roller on the top of the plate.

3. Make sure the cover is removed from the magazine and position the magazine so that the magazine is aligned with the roller on the mounting place, as shown in the following figure.

4. Insert the bottom end of the magazine first, then snap the magazine into place by pressing against the top.



Step 6 – Install a cleaning cartridge

The following procedure describes how to manually install a cleaning cartridge in the fixed cartridge slot. To replace this cartridge after the library has been in operation, use the Remove Cartridge and Insert Cartridge options on the Maintenance Menu and the entry/exit port, as described on page 73.

➤ **Important** If you are using Exabyte Mammoth tape drives, use an Exabyte Mammoth 8mm Cleaning Cartridge (or a cleaning cartridge approved by Exabyte for use with Mammoth).

If you are using the Eliant 820 tape drives, use an Exabyte Premium 8mm Cleaning Cartridge (or a cleaning cartridge approved by Exabyte for use with your tape drive).

The Mammoth tape drive ejects all other 8mm cleaning cartridges, and the Eliant 820 ejects Mammoth 8mm Cleaning Cartridges.

CAUTION

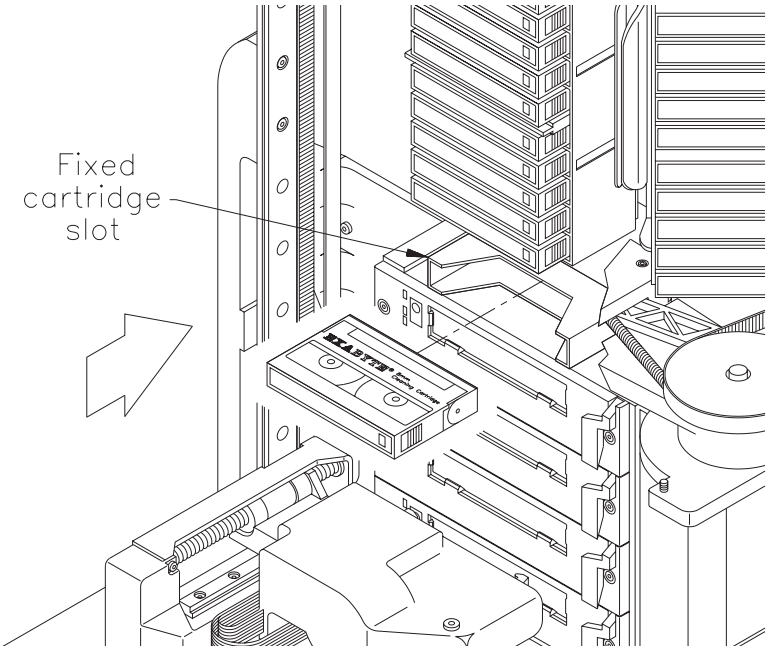
Use Exabyte or Exabyte-approved cleaning cartridges only. Using cloth swabs, cotton swabs, cleaning agents, or cleaning cartridges not approved for your tape drive by Exabyte may void the tape drive warranty.

➤ **Important** If you want to clean the drives using the Clean Drives Menu on the LCD, you must install a cleaning cartridge in the fixed cartridge slot.

To install a cleaning cartridge in the fixed cartridge slot:

1. Position the cartridge so that the window showing the tape reels is to the top (see the following figure).

2. Insert the cartridge into the fixed cartridge slot until it snaps into place.



Step 7 – Close and lock the front door

Close the library door and turn the key one-quarter turn to the left. Remove the key and keep it in a safe place.

Step 8 – Connect the library to the SCSI bus

This section contains general guidelines for connecting the library to the SCSI bus. The SCSI connectors for the library and tape drives are accessible through the cabling bay at the back of the library.

➤ **Important** If you have an Exabyte 440 or Exabyte 480 with Eliant 820 tape drives and the library is not the last device on the SCSI bus, you may need to install ferrite clamps on a SCSI cable to maintain compliance with the CISPR 22 Class B standard. If necessary, ferrite clamps are provided with the library; see the instructions packaged with the clamps for more information.

Before you begin

1. Make certain the host computer and any peripheral devices are powered off.

CAUTION

To avoid damaging the tape drives, make sure the tape drives and library are powered off when you connect the library to the SCSI bus.

2. If you are unfamiliar with connecting devices on a SCSI bus, first read Appendix B.

3. Determine the SCSI bus configuration (that is, how many SCSI buses you will connect to the library and which bus you will connect to which device).

4. Be aware that you can connect single-ended and low-voltage differential (LVD) SCSI devices to the same SCSI bus. Mixing the two types of devices results in all devices on the bus operating as single-ended devices.

CAUTION

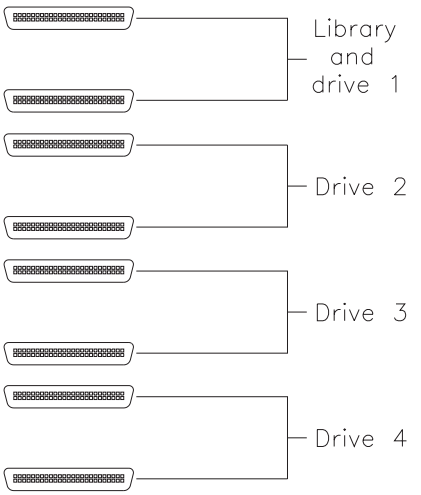
Do not connect an LVD library to an HVD SCSI bus, or you may damage the devices attached to the bus.

Connecting the narrow library to the SCSI bus

Narrow SCSI libraries have eight connectors and can operate on up to four SCSI buses. The library and Drive 1 share connectors and must operate on the same SCSI bus. Drives 2 through 4 can operate on individual buses.

To connect the narrow library to the SCSI bus:

1. Connect the library to the SCSI bus, using the connector assignments shown in the following figure.



2. Install SCSI cables as required to connect the library devices to the other devices on the SCSI bus.

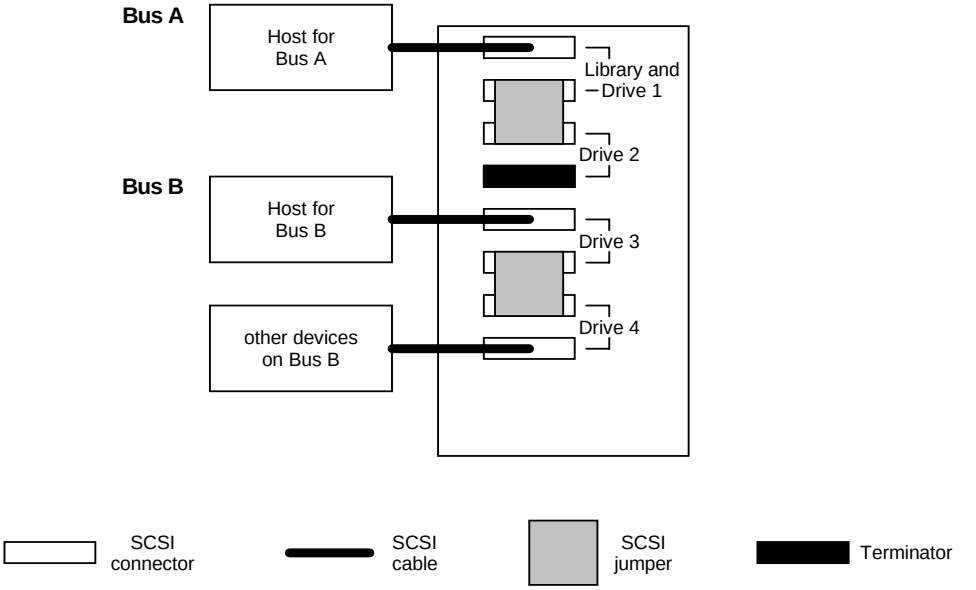
3. If more than one device in the library is on the same bus, place a jumper between the appropriate connectors. (For narrow libraries, note that you do not need to install a jumper between the library and the uppermost tape drive since they share the same connectors.)

4. For each device that terminates the bus (either the library or one of the tape drives), install a terminator on one of the connectors for that device. See the following section for an example of a narrow SCSI library connected to two buses.

Example: Narrow library on two SCSI buses

- On SCSI Bus A, a cable connects the host to the library and Drive 1, and a jumper connects the library and Drive 1 to Drive 2. Bus A is terminated with an external terminator installed on the lower connector for Drive 2.

- On SCSI Bus B, a cable connects a second host to Drive 3, and a jumper connects Drive 3 to Drive 4. A cable connects Drive 4 to the other devices on Bus B.

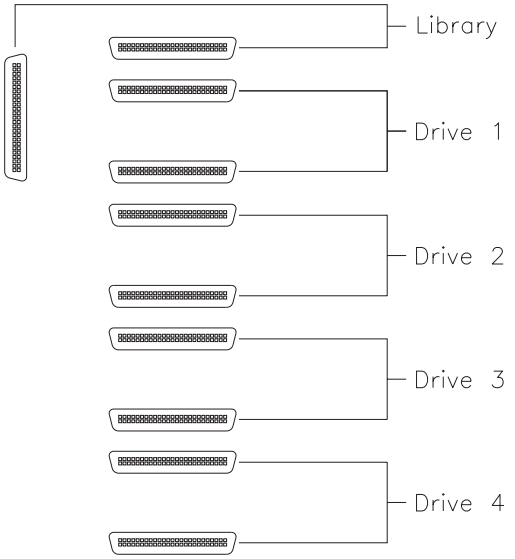


Connecting the wide SCSI library to the SCSI bus

Wide SCSI libraries have ten connectors and can be attached to up to five SCSI buses (all four tape drives and the library can be on separate buses).

To connect the wide library to the SCSI bus:

1. Connect the library to the SCSI bus, using the connector assignments shown in the following figure.



2. Install SCSI cables as required to connect the library devices to the other devices on the SCSI bus.

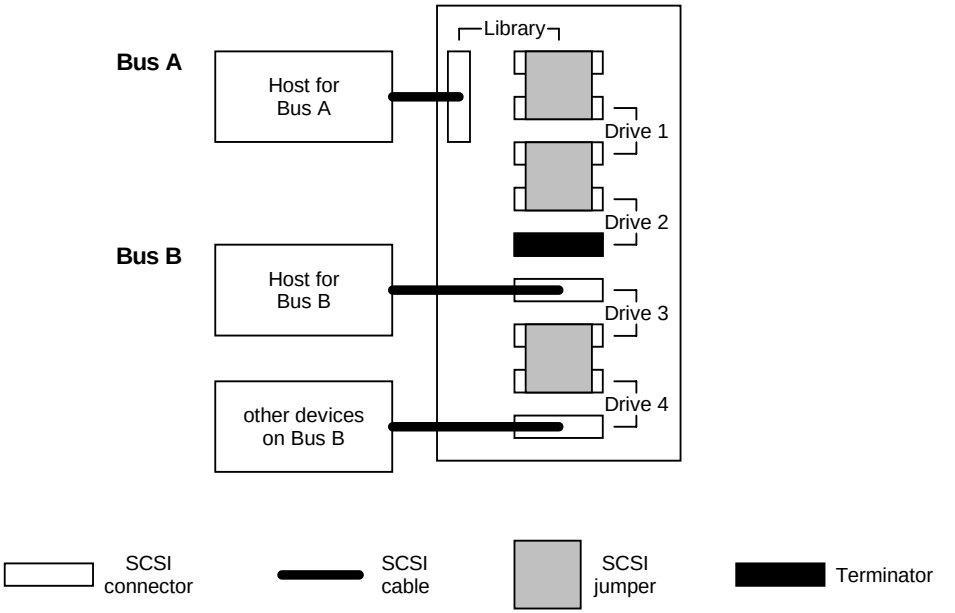
3. If more than one device in the library is on the same bus, place a jumper between the appropriate connectors.

4. For each device that terminates the bus (either the library or one of the tape drives), install a terminator on one of the connectors for that device. See the following section for an example of a wide SCSI library connected to two buses.

Example: Wide library on two SCSI buses

- On SCSI Bus A, a cable connects the host to the library, and jumpers connect the library to Drive 1, and Drive 1 to Drive 2. Bus A is terminated with an external terminator installed on the lower connector for Drive 2.

- On SCSI Bus B, a cable connects a second host to Drive 3, and a jumper connects Drive 3 to Drive 4. A cable connects Drive 4 to the other devices on Bus B.



Step 9 – Connect the power cord

➤ **Important** The power cord shipped with the library is a 120 VAC three-conductor power cord for use in the United States or Canada. If you are planning to use another input voltage or if you plan to use the library outside of the U.S. or Canada, you must supply your own power cord. For more information, refer to Appendix A.

1. Make sure that the power switch on the back of the library is off (the 0 is pressed).
2. Connect the female end of the power cord to the power connector on the back of the library.
3. Plug the male end of the power cord into the power source.

   Note: The library has autoranging voltage selection, so you do not need to change the voltage setting.

Step 10 – Power on the library

1. Make sure the library's door is closed and locked.
2. Power on the host computer.

   Note: If your host requires that attached peripheral devices be powered on before the host, power on the library before powering on the host.

3. Push the power switch on the back of the library to the on (I) position.

4. Wait while the library performs its power-on self-test. During this time, the following activities occur:

   - The cooling fan begins to rotate.
   - The LCD illuminates and displays the Main Screen.
   - The tape drives perform their power-on self-tests.
   - The library performs its power-on self-test.

If problems occur...

If the library does not power on as described	Check the following: ▪ Is the power switch on? (Is the I pressed?) ▪ Is the power cord inserted correctly? ▪ Is the library door closed and locked? ▪ Is the SCSI bus terminated? ▪ Is the host computer system turned on? ▪ Is the SCSI cable connected to the library and host computer?
If an error code is displayed on the LCD	See Appendix C for a list of error codes and corrective actions.
If you cannot solve the problem yourself	Contact your service provider or Exabyte Technical Support.

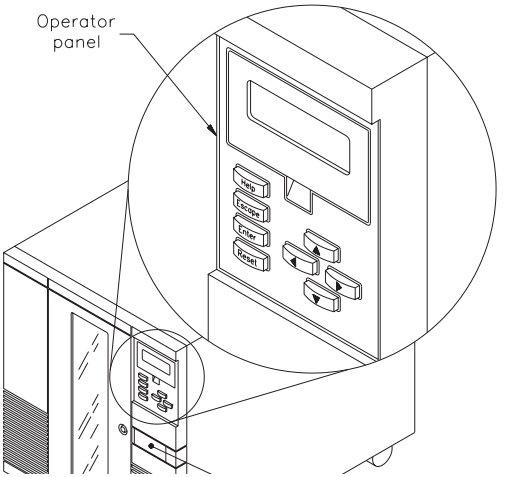
3 Configuration

After installing the library hardware, you need to set or check the library's configuration options. This chapter describes:

- Using the operator panel for setting configuration options
- Displaying the configuration menu
- Setting the SCSI IDs (required)
- Setting other configuration options, if necessary
- Setting robot control modes

Using the operator panel

The library includes a four-line LCD and keypad, called the *operator panel*, that allows you to control library operations. Using the operator panel (shown in the following figure), you can set library options, check operating statistics, and diagnose errors. If desired, you can tilt the LCD for easier viewing.



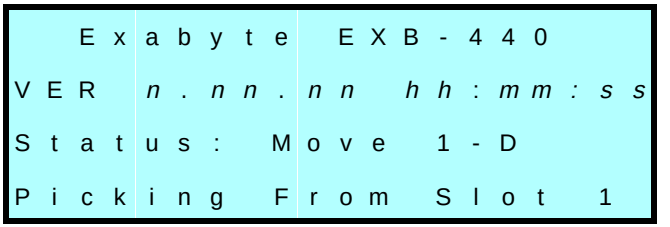
Operator keys

The keys on the operator panel perform the following functions:

↑ ↓	Scrolls the screen arrow (→) up or down. The screen arrow points to the current selection.
← →	In some screens, moves the screen arrow left or right. On some menu selections, toggles an option on or off.
Enter	Selects the item next to the screen arrow or accepts a change.
Escape	Returns to the previous menu or screen, or cancels an operation without saving changes.
Reset	Displays the Reset screen, which allows you to reset the library and the tape drives.
Help	Displays the Help screen. To exit Help, press Escape.

Main Screen

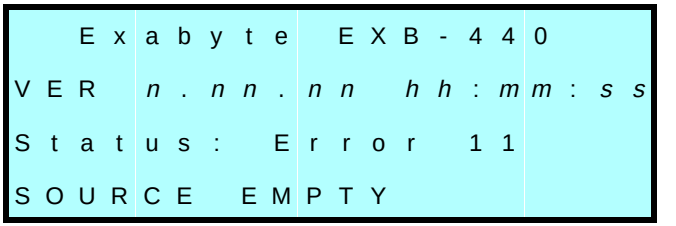
The Main Screen appears when you apply power to the library. The first and second lines on the Main Screen display the product name, version, and the current time. The third and fourth lines display status information about the library and tape drives; and if a hardware error occurs these lines display information about the error. An example of the Main Screen with a status message is shown below.



Note: The exact wording of the Main Screen may be different on your screen.

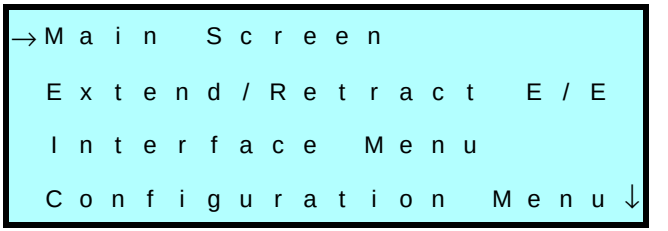
Error codes

If a library hardware error occurs, an error code appears on the third and fourth lines of the Main Screen. The third line provides the error's numerical code; the fourth line provides a brief explanation of the error. You must correct the error before operation can continue. (Refer to Appendix C for a list of error codes and corrective actions.)



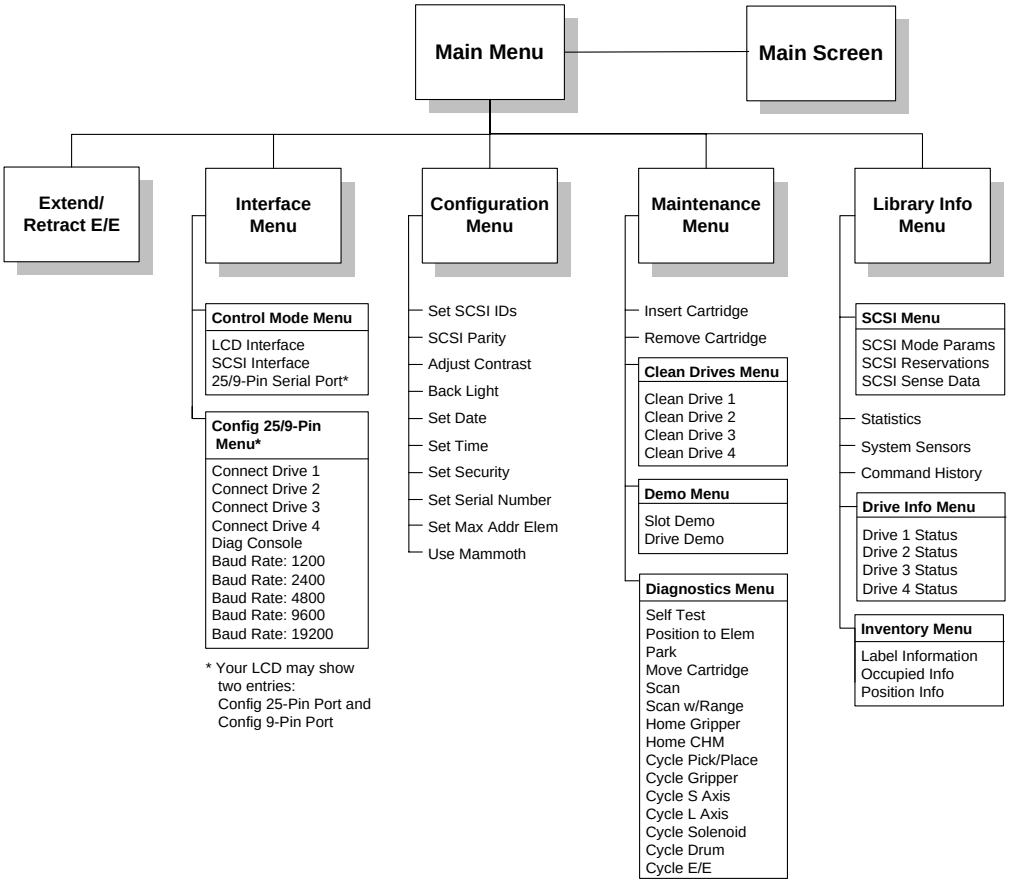
Main Menu

Use the Main Menu (shown below) to access LCD options and functions. To access the Main Menu, press Escape from the Main Screen.



The selections on the Main Menu are described in the following table. The menu structure is shown on the next page.

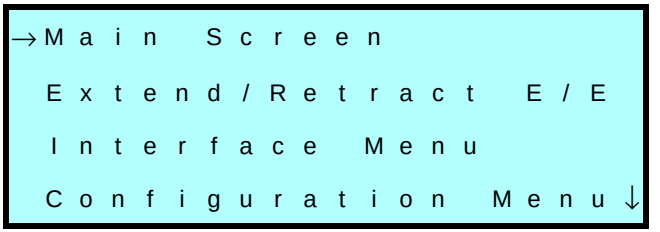
Main Menu Selections	
Main Screen	Returns to the Main Screen.
Extend/Retract E/E	Allows you to control the entry/exit port.
Interface Menu	Allows you to specify how CHM motion is controlled and to configure the serial ports.
Configuration Menu	Allows you to set SCSI IDs, security, and other configuration options.
Maintenance Menu	Allows you to clean the tape drive and perform diagnostics.
Library Info Menu	Provides tape drive status information and diagnostic information for service technicians.


Main Menu
Main Screen
Extend/ Retract E/E
Interface Menu
Configuration Menu
Maintenance Menu
Library Info Menu
Control Mode Menu
LCD Interface
SCSI Interface
25/9-Pin Serial Port*
Config 25/9-Pin Menu*
Connect Drive 1
Connect Drive 2
Connect Drive 3
Connect Drive 4
Diag Console
Baud Rate: 1200
Baud Rate: 2400
Baud Rate: 4800
Baud Rate: 9600
Baud Rate: 19200
* Your LCD may show two entries: Config 25-Pin Port and Config 9-Pin Port
Set SCSI IDs
SCSI Parity
Adjust Contrast
Back Light
Set Date
Set Time
Set Security
Set Serial Number
Set Max Addr Elem
Use Mammoth
Insert Cartridge
Remove Cartridge
Clean Drives Menu
Clean Drive 1
Clean Drive 2
Clean Drive 3
Clean Drive 4
Demo Menu
Slot Demo
Drive Demo
Diagnostics Menu
Self Test
Position to Elem
Park
Move Cartridge
Scan
Scan w/Range
Home Gripper
Home CHM
Cycle Pick/Place
Cycle Gripper
Cycle S Axis
Cycle L Axis
Cycle Solenoid
Cycle Drum
Cycle E/E
SCSI Menu
SCSI Mode Params
SCSI Reservations
SCSI Sense Data
Statistics
System Sensors
Command History
Drive Info Menu
Drive 1 Status
Drive 2 Status
Drive 3 Status
Drive 4 Status
Inventory Menu
Label Information
Occupied Info
Position Info

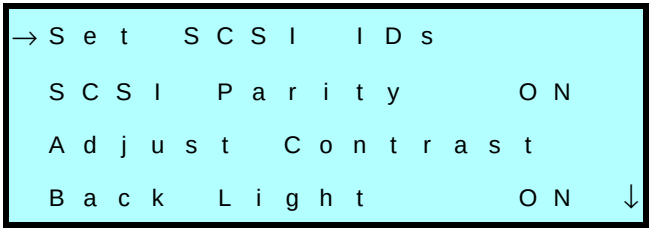
Displaying the Configuration Menu

Use the Configuration Menu to view and change the configuration options for your library. To display the Configuration Menu:

1. Access the Main Menu by pressing Escape on the keypad. The Main Menu appears:



2. Press ↓ until the screen arrow points to the Configuration Menu. Then press Enter. The Configuration Menu appears:



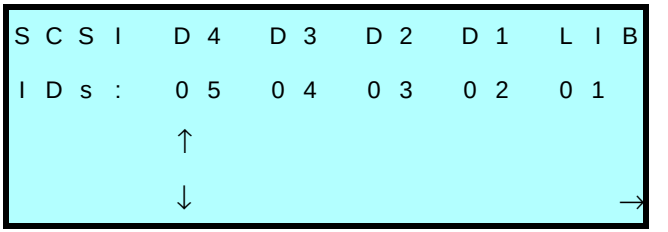
Setting the SCSI IDs

Default SCSI IDs are assigned at the factory for the library and each tape drive. Drive blanks are assigned B (for *blank*). This section describes how to view the default settings and change them if necessary.

➤ **Important** The library and tape drives must each have a unique SCSI ID within each SCSI bus. Because you may have multiple SCSI buses, the library does not check for duplicate SCSI IDs. It is your responsibility to make sure you do not assign duplicate SCSI IDs within a SCSI bus.

To view or change SCSI IDs:

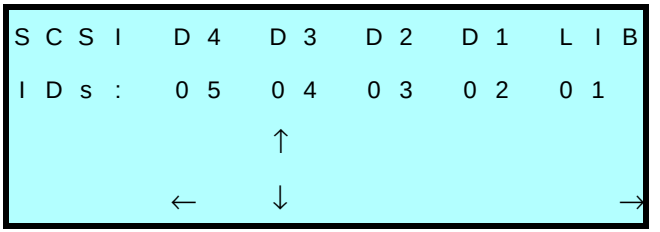
1. From the Configuration Menu, select Set SCSI IDs. The following screen appears:



Note: The SCSI IDs shown are examples only; your settings may differ. If one of the drive carrier slots contains a drive blank, the library displays a B (for *blank*) instead of a SCSI ID.

2. To set the SCSI ID for the bottom tape drive (D4), press ↑ or ↓ until the screen displays the desired SCSI ID.

3. Press → to move the screen arrows to D3, as shown. Press ↑ or ↓ until the screen displays the SCSI ID you want.

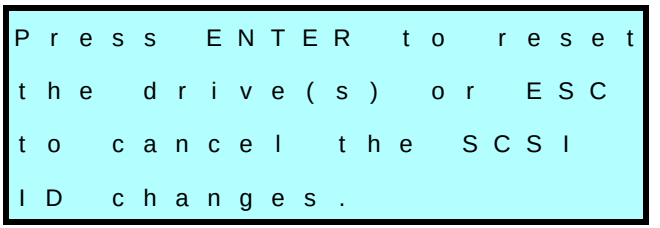


Note: If any drive carrier slot contains a drive blank, the cursor will skip over the SCSI ID field for that slot.

4. Continue this process until you have set the SCSI IDs for all tape drives and the library.

5. When the SCSI IDs for all tape drives and the library are correct, press Enter to accept your choices.

6. If you have changed one or more of the tape drive IDs, the following screen appears:



7. Press Enter. The library resets the tape drives with changed IDs and returns to the Configuration Menu.

Setting the remaining configuration options

The Configuration Menu contains other configuration options described in the following sections. If desired, you can check these settings and change them.

SCSI Parity

The SCSI Parity option allows you to enable parity checking for the library (if the SCSI adapter card connected to the library supports it). When this option is enabled, the library checks all data coming across the SCSI bus for parity. The setting you specify remains in effect across power cycles.

Note: Parity checking can also be enabled and disabled by the application software using a SCSI MODE SELECT command. The method last used to set parity checking (LCD or SCSI command) has precedence.

Parity checking for tape drives is set separately. See the tape drive's SCSI reference for more information.

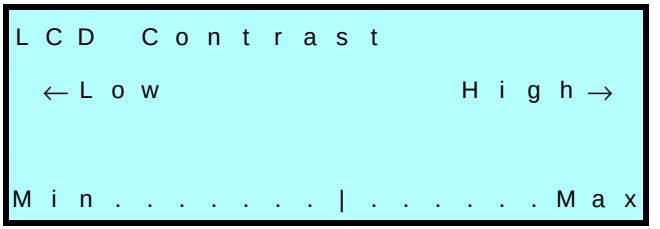
To change SCSI parity:

1. From the Configuration Menu, scroll until the screen arrow points to SCSI Parity.
2. Press ← and → to toggle parity checking on and off.
3. Press Escape to return to the Main Menu.

Adjust Contrast

The Adjust Contrast option controls the brightness of the lettering on your LCD. To adjust the contrast:

1. From the Configuration Menu, select Adjust Contrast. The following screen appears:



2. Press → and ← to change the contrast, then press Enter.

Back Light

The Back Light option turns the LCD background on or off. To change the back light:

1. From the Configuration Menu, scroll until the screen arrow points to Back Light.

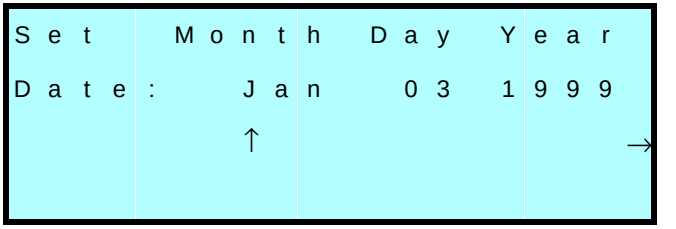
2. Press ← and → to toggle back lighting on and off.

3. Press Escape to return to the Main Menu.

Set Date

The Set Date option allows you to set the date for the library. The date appears on the Command History screen (see page 106) and on diagnostic listings (see *Exabyte 440 and Exabyte 480 8mm Libraries Maintenance*). To set the date:

1. From the Configuration Menu, select Set Date. The following screen appears:



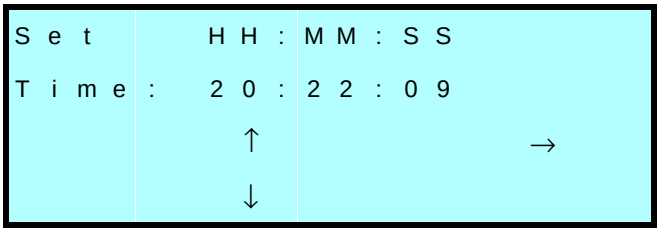
2. Press ↑ and ↓ to cycle through the selections under Month, Day, and Year. Use ← and → to move between the columns.

3. Press Enter to save your changes and exit the Set Date screen.

Set Time

The Set Time option allows you to set the time that is shown on the library's Main Screen and Command History screen (see page 106). To set the time:

1. From the Configuration Menu, select Set Time. The following screen appears:



2. Use ↑ and ↓ to toggle through the selections under HH (hours), MM (minutes), and SS (seconds). Use ← and → to toggle between the columns.

3. Press Enter to save your changes and exit the Set Time screen.

Set Security

The Security option allows you to prevent unauthorized personnel from disrupting the operation of the library. When you enable security, the following activities are prevented:

- Changing SCSI IDs
- Changing SCSI parity checking
- Changing the control mode
- Setting the library serial number
- Changing the installed tape drive model
- Using the LCD Diagnostics Menu and Demo Menu
- Using the Clean Drives Menu
- Opening the front door
- Communicating with a tape drive across a serial port
- Extending the entry/exit port

If you attempt to perform any of these operations when security is enabled, the library displays a message that states security is active. The message also states whether security was enabled from the operator panel or by the application through a SCSI command.

Methods for enabling and disabling security

Security can be enabled and disabled in either of two ways:

- You can set the security option from the LCD on the operator panel using the Configuration Menu, as described in this section.

- The application software can issue a SCSI MODE SELECT command to turn security on and off (see your software documentation or the *EXB-440 and EXB-480 8mm Libraries SCSI Reference*).

Note: SCSI MODE SELECT security prevents the same activities as LCD security, except for opening the front door.

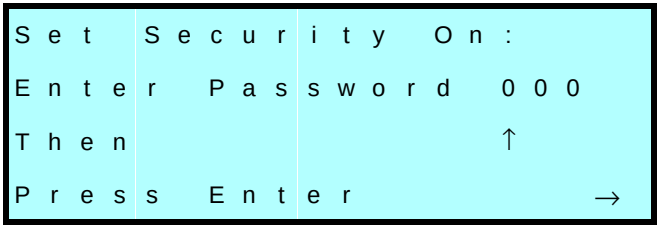
The method used to enable security (LCD or SCSI) must also be used to disable security. That is, if you enable security from the operator panel, you must disable it from the operator panel. If security is enabled by the application (SCSI), it must be disabled by the application.

Note: To determine if security has been set by your application, look at the SCSI Mode Parameters screen (see page 96).

Security remains in effect across library resets.

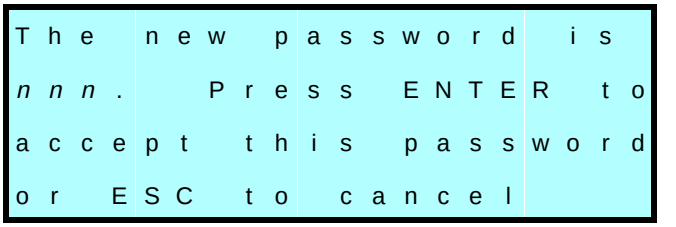
Enabling security from the operator panel

1. From the Configuration Menu, select Set Security On. The library displays the following screen:



Note: If the menu displays Set Security Off, the security option has already been enabled.

2. Select a three-digit password. Press → and ← to move from column to column and ↑ and ↓ to change the numbers. (The default password is 000.) When you are finished, press Enter. The library displays the following screen:

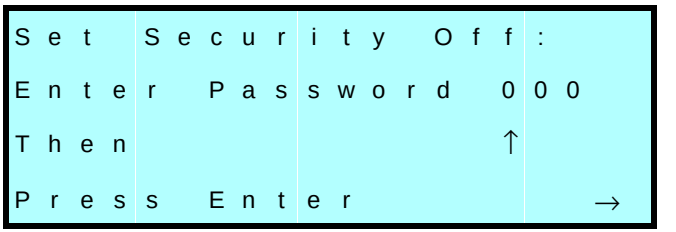


3. To confirm the new password, press Enter. Or, to exit without saving the password, press Escape.

➤ **Important** You must use the same password to turn security off.

Disabling security from the operator panel

1. From the Configuration Menu, select Set Security Off and press Enter. The library displays the following screen:



Note: If the menu displays Set Security On, the LCD security function is disabled. However, security may have been enabled by your application using a SCSI command. If so, it must be disabled by your application (see your software documentation or the *EXB-440 and EXB-480 8mm Libraries SCSI Reference*).

2. To enter the three-digit password, press → and ← to move from column to column and ↑ and ↓ to change the numbers. When you are finished, press Enter.

If you forget the password Try entering the default password (000). If the default password has been changed and you do not know what it is, call your service provider.

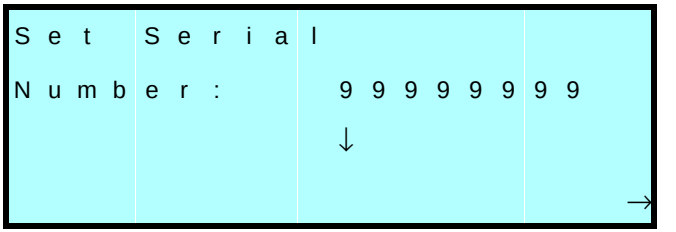
Set Serial Number

The serial number is entered into the library firmware at the factory. If you want to check that number, look at the serial number label on the back of the library or use the Set Serial Number option. The serial number displayed on this screen appears on diagnostic listings.

Note: If the serial number has never been entered, the number stored in memory is 99999999.

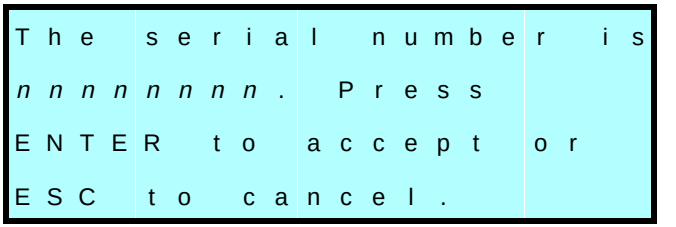
To check the serial number:

1. From the Configuration Menu, select Set Serial Number. The following screen appears:



2. If necessary, enter the serial number by pressing ↑ and ↓ to change each digit. Press ← and → to move from column to column.

3. After setting the serial number, press Enter. The following screen appears:



4. Press Enter to save your changes or press Escape to cancel changes.

Set Max Addr Elem

The Maximum Addressable Element option allows you to decrease the number of cartridge storage slots your library reports to the software. This means the library can use and report fewer slots than are physically present. This option is useful with software applications that offer scalable licenses based on the number of cartridges.

> ➤ **Important** If your software does not monitor the number of slots you are using, you do not need to set this option. Refer to your software documentation for more information.

When you set the Maximum Addressable Element option, you are specifying the highest element number that can store a cartridge. For example, if the software license you purchased supports 16 cartridges, you need to set the option to 15. This tells the library to place cartridges in slot 0 through slot 15, resulting in 16 storage locations.

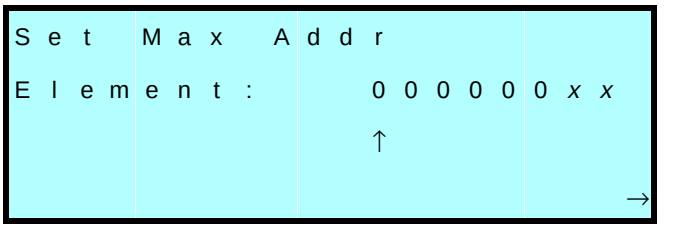
The default value for the Maximum Addressable Element is the highest cartridge slot that can store a cartridge. For example, in an Exabyte 440 library, the default number would be 40 because the cartridge slots start at slot 0 and go to slot 40, making slot 40 the highest slot number that can store a cartridge. The element index figures in Appendix D show how the cartridge slots are numbered in your library.

To set the Maximum Addressable Element option:

1. Make sure the library door is closed and locked.

> **CAUTION**
>
> Be sure to close and lock the library door before setting the Maximum Addressable Elements option. If you set this option with the library door open, the library may time out and you may lose data.

2. From the Configuration Menu select Set Max Addr Elem and press Enter. The following screen appears:



In the example above, *xx* is the current setting for the Maximum Addressable Element option.

3. Use the → and ← keys to move the screen arrow under the digit you want to change. Then use the ↑ or ↓ keys to change the selected digit.

Note: If you set this option to a number higher than the number of cartridge slots physically present, the library automatically sets the Maximum Addressable Element to the highest slot number that can store a cartridge. For example, if you have an Exabyte 440 library and you set the Maximum Addressable Element option to 60, the library changes the setting to 40 because slot 40 is the highest slot number that can store a cartridge.

4. Press Enter. The library prompts you for confirmation. If the number is correct, press Enter.

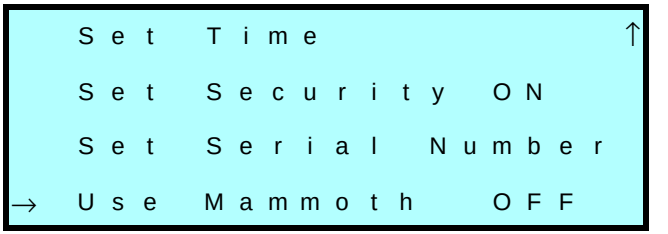
Use Mammoth

The Use Mammoth option configures the library to communicate properly with the installed tape drive. When Use Mammoth is on, the library configures to communicate with an Exabyte Mammoth tape drive. When Use Mammoth is off, the library configures to communicate with a non-Mammoth tape drive.

➤ **Important** If you want to upgrade to Mammoth tape drives, you must obtain an upgrade kit from Exabyte.

To view the tape drive model:

1. From the Configuration Menu, select Use Mammoth.



2. Press ← and → to toggle Use Mammoth on and off.
3. Press Escape to return to the Main Menu.

➤ **Important** If you are using Eliant 820 or Exabyte 8505XL tape drives, make sure the Use Mammoth option is OFF. If Use Mammoth is ON, you may not be able to read or write data.

Setting robot control modes

To determine which interface will control CHM motion, you can set the library to one of the following control modes:

- SCSI Interface
- LCD Interface
- 25-Pin or 9-Pin (narrow libraries)
- 25/9-Pin (wide libraries)

These control modes allow you to operate the library with the application software (SCSI Interface) or perform diagnostic functions on the library (LCD Interface, 25-Pin, 9-Pin, 25/9-Pin).

Refer to the following section for control mode descriptions. Refer to page 69 for instructions about changing the control mode.

Note: Control mode settings remain through power cycles.

SCSI Interface mode

In SCSI Interface mode, your application software controls the motion of the CHM by issuing SCSI commands across the SCSI bus attached to the library.

Note: The application software can issue commands to the library regardless of the control mode. However, the library must be in SCSI Interface mode for the software to control the motion of the CHM.

For detailed information about the SCSI commands supported by the Exabyte 440 and Exabyte 480, refer to the *EXB-440 and EXB-480 8mm Libraries SCSI Reference.*

LCD Interface mode

When the library is operating in LCD Interface mode, you can control the motions of the CHM from the operator panel.

Note: You can use many operator panel features without changing to LCD Interface mode. LCD Interface mode is required only when you want to control the motions of the CHM from the operator panel.

9-Pin and 25-Pin Port modes or 25/9 Pin mode

When the library is operating in a serial port mode (9-Pin or 25-Pin Port mode for narrow libraries; 25/9 Pin Port mode for wide libraries), you can control the motions of the CHM from a remote console program connected to the library's 9-pin or 25-pin port.

Note: Use the 9-Pin, 25-Pin, or 25/9 Pin mode to control CHM motion only. You do not need to change the control mode to access a tape drive's serial port.

Changing the control mode

1. Make sure the library is in the ready state (for example, no hardware errors, the door is closed, and so on).
2. If security has been enabled, disable it. See page 60.
3. From the Main Menu, select Interface Menu.
4. From the Interface Menu, select Control Mode Menu.
5. Select the desired control mode. The current control mode is indicated with an asterisk (*).

> ➤ **Important** When the library is in LCD Interface mode or in one of the serial port modes, the software application cannot control the CHM.

6. When the library displays a confirmation message that it has changed the control mode, press Escape to return to the Interface Menu, and Escape again to return to the Main Menu.

Checking the setup

After installing the hardware and software, check the setup by performing some exercises on the library. (While these exercises are not required, it is a good idea to verify that your software and hardware are communicating properly before you begin operations.)

- Use the options on the Diagnostic Menu to exercise the hardware. This determines whether the library hardware components are operating properly. See Chapter 7 for instructions.

- Instruct the application software to load some cartridges into each tape drive. This determines whether the software and library are communicating properly.

- Back up several megabytes of data to each tape drive and perform a comparison check on the backed up data. This determines whether the software and tape drives are communicating properly.

If problems occur...

If the library and tape drives are not operating as expected	See Chapter 8 for troubleshooting information.
If there is an error code displayed on the LCD	See Appendix C for a list of error codes and corrective actions.
If you cannot solve the problem yourself	Contact your service provider or Exabyte.

4 Library Operation

Once the library and application software are installed and configured, you can automatically perform backup and restore operations using the software. You should not need to intervene in the cartridge processing during normal library operations.

This chapter describes library operations that you may occasionally need to perform:

- Selecting and replacing data cartridges
- Resetting the library

Selecting and replacing data cartridges

This section describes how to:

- Select the appropriate data cartridges for your tape drive
- Replace a single cartridge
- Replace the cartridge magazines
- Store data cartridges when not in the library

Selecting data cartridges

Always use Exabyte media to achieve the best tape drive performance. Tape drives are tested to specifications using Exabyte media at the factory.

➤ **Important** Because of media management and application software issues, Exabyte recommends that you do not mix AME and MP data cartridges in the same library. If you must mix AME and MP cartridges, contact your application software vendor.

CAUTION

Never use video-grade tape for data storage. Video-grade tape can be less accurate than data-grade tape and is more abrasive to tape drive recording heads.

The following table lists the data cartridges to use with the type of tape drive installed in your library.

Tape drive model	Compatible data cartridges
Exabyte Mammoth	Exatape Advanced Metal Evaporated (AME) Data Cartridges, in lengths of 22m and 170m. Exabyte Mammoth can read, but not write, MP data cartridges.
Eliant 820	Exatape 8mm Metal Particle (MP) Data Cartridges, in lengths of 15m, 54m, 112m, or 160m XL.

Replacing a single cartridge

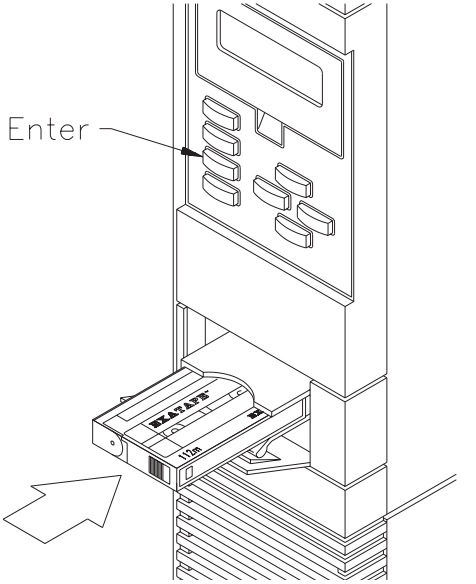
As described in this section, you can use several different methods to replace single cartridges without opening the library door.

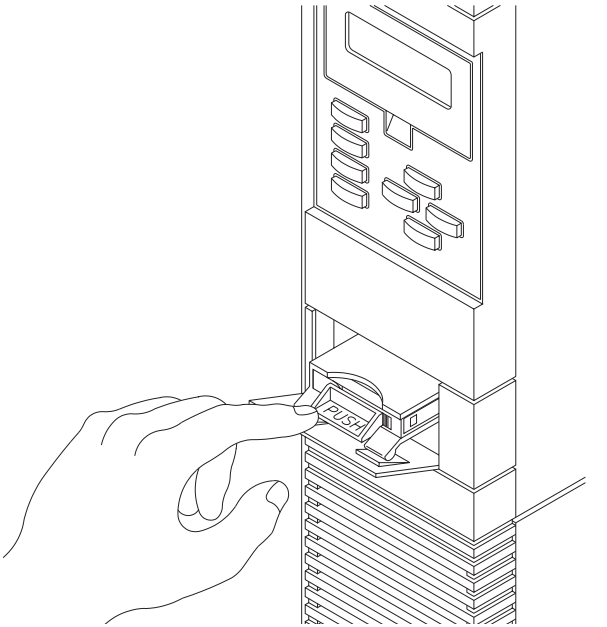
- Use the **Extend/Retract E/E** option to insert or remove cartridges through the entry/exit port.
- Use the **Remove Cartridge** option to remove the cartridge.
- Use the **Insert Cartridge** option to replace the cartridge.

➤ **Important** Do not open the library door to replace individual cartridges. Opening and closing the library door causes the library to update the cartridge inventory, which takes approximately 2½ to 5 minutes.

Using the Extend/Retract E/E option

1. Make sure that security is disabled (see page 60).
2. From the Main Menu, select Extend/Retract E/E. The library extends or retracts the entry/exit port transport arm, depending on its current position.
3. Insert the cartridge into the entry/exit port and press Enter; or, remove a cartridge by pressing down on the entry/exit port PUSH tab, as shown in the following figures.


Enter


PUSH

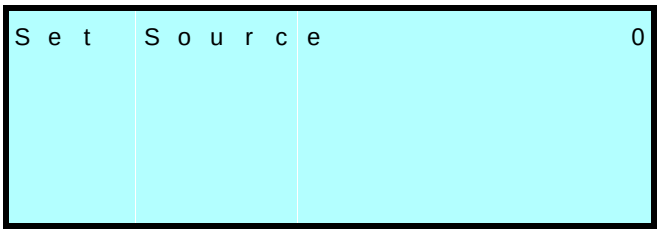
Using the Remove Cartridge option

1. Make sure security is disabled (see page 60).

2. Change to LCD Interface control mode (see page 67).

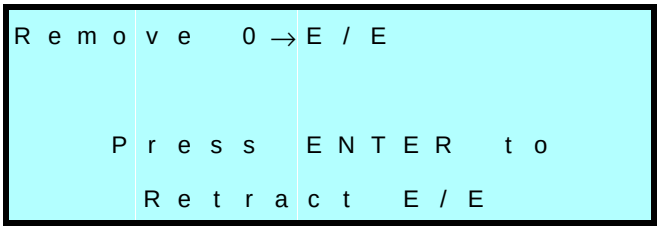
3. From the Main Menu, select Maintenance Menu.

4. From the Maintenance Menu, select Remove Cartridge. The following screen appears:



5. Press ↑ or ↓ to set the source element index (the index of the slot or tape drive where the cartridge is located). For more information about element indexes, see Appendix D.

6. Press Enter. The CHM moves the cartridge to the entry/exit transport arm, and the transport arm extends to the entry/exit port. The library displays a screen similar to the following (the source index may be different):



7. Press down on the entry/exit port PUSH tab and remove the cartridge (see the second figure on page 74).

8. Press Enter to retract the entry/exit transport arm.

9. Press Escape to return to the Maintenance Menu.

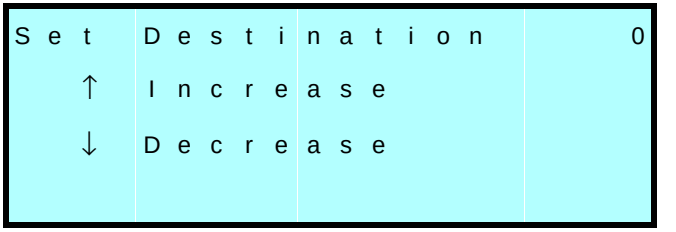
Using the Insert Cartridge option

1. Make sure security is disabled (see page 60).

2. Change to LCD Interface control mode (see page 67).

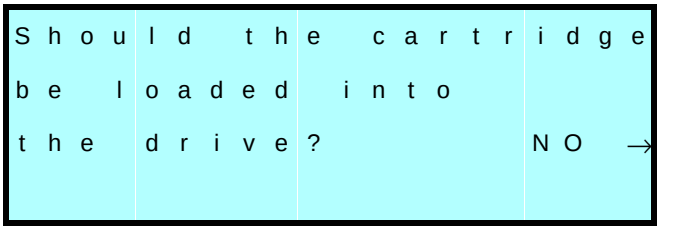
3. From the Main Menu, select Maintenance Menu.

4. From the Maintenance Menu, select Insert Cartridge. The library displays the following screen:

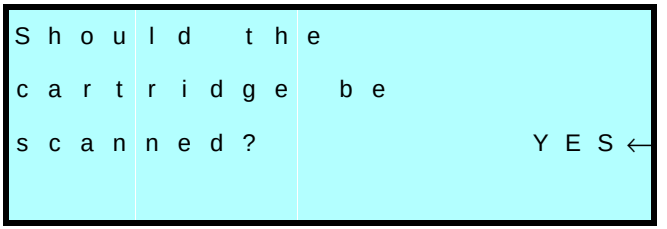


5. Press ↑ or ↓ to set the destination element index (the index of the slot or drive in which you want to place the cartridge). For more information about element indexes, see Appendix D.

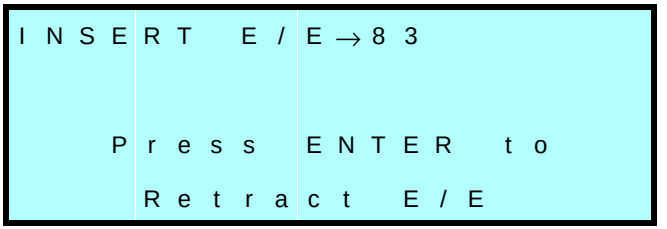
6. Press Enter. If the location is a tape drive, the library displays the following prompt:



7. If you want to load the cartridge into the tape drive, press → to select YES and press Enter. The library displays the following prompt:



8. If you do not want to scan the bar code label on the cartridge, press ← to select NO and press Enter. The library displays a screen similar to the following (the destination index may be different):



9. Insert the cartridge in the entry/exit port with the cartridge door flap to the left and press Enter (see the second figure on page 74).

10. Press Escape to return to the Maintenance Menu.

Storing data cartridges

To maximize the shelf life of your data cartridges and ensure data integrity, follow the guidelines below when storing cartridges.

- **Store cartridges in a suitable environment.** Follow the specifications for storage temperature and other environmental requirements, as described on the cartridge packaging. Do not allow the temperature and humidity in the storage environment to fluctuate.

- **Keep the storage area as free of airborne particulates as possible.** To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not store cartridges near a copier or printer that may emit toner and paper dust.

- **Store cartridges as soon as possible** after you remove them from the library. Immediate storage helps avoid many of the conditions that can damage tapes, such as temperature and humidity fluctuation, particulate contamination, and excessive handling.

- **Store cartridges with the write-protect switch in the protected position** (the red switch is fully visible).

- **If possible, store data cartridges in a cartridge magazine.** In the cartridge magazine, cartridges are protected from airborne contaminants by a clear plastic cover. With the cover in place, the magazines can be stacked on top of each other to make the most efficient use of storage space.

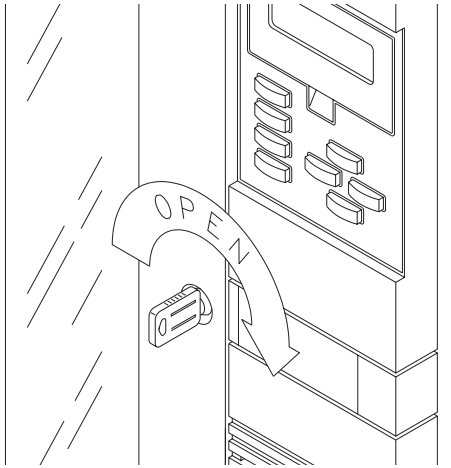
Replacing the cartridge magazines

To open the door and replace a data cartridge magazine:

1. Insert the key in the lock, push in, and turn it one quarter turn to the right, as shown in the following figure. When you unlock the door:

- The library completes its current operation, moves the CHM to the home position at the bottom of the long axis, rotates the drum assembly to the home position, and turns off current to all motors.
- The interlock mechanism releases.

➤ **Important** Do not open the library door unless you need to remove and replace cartridge magazines or perform a maintenance operation. It takes 2½ to 5 minutes for the library to update the cartridge inventory after the door is opened and closed.



2. When the door's interlock mechanism releases, open the door.

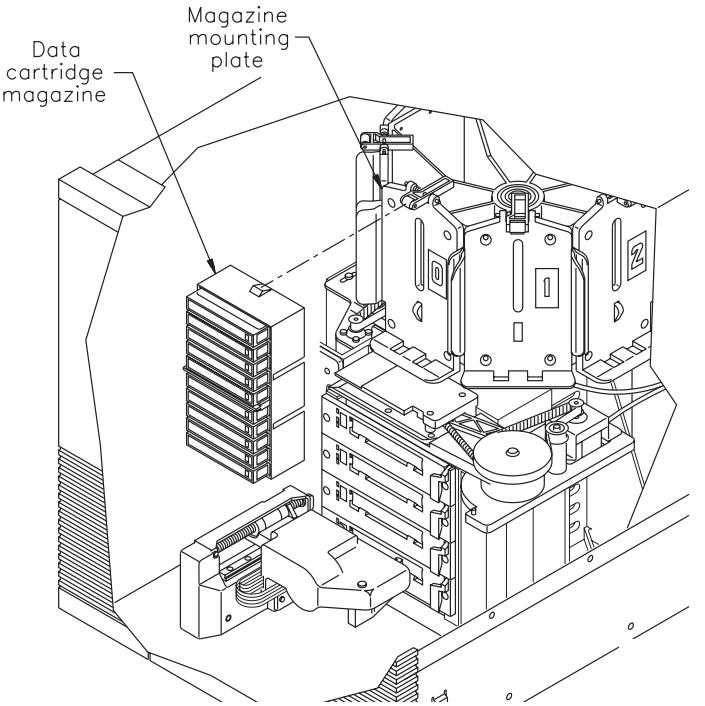
> **CAUTION**
>
> Do not force the door open. The door's interlock mechanism may be prevented from releasing by LCD security or by the application software.

3. Make sure the CHM and its cabling are safely out of the way of the magazines. If necessary, move the CHM to the bottom of the long axis by pushing firmly against its base.

4. If necessary, manually rotate the drum assembly to access the cartridge magazine you want to remove.

5. Grasp the cartridge magazine on either side, pull it out first from the top, then the bottom.

6. If desired, replace the magazine by positioning it over the mounting plate with the single mounting guide toward the top.



7. Insert the bottom of the magazine first, then snap the magazine into place by pressing against the top.

8. Close the door and lock it by turning the key a quarter turn to the left. After the door is closed:

- The library performs its power-on self-test.
- The library returns Unit Attention status to the host.
- The software may update its own cartridge inventory.

Resetting the library

If the library has encountered an error and is still not operating after you have tried the corrective action for the error, you may need to reset the library. A reset causes the library and the tape drives to perform their power-on self tests. Unless configured otherwise, tape drives will rewind the tape after a reset, but will not eject the data cartridge.

Note: If the library is performing a cartridge move operation when it is reset, it completes the move operation before it performs the power-on self-test.

> **CAUTION**
>
> Before resetting the library, make sure the library or tape drives are not communicating across the SCSI bus. Resetting the library and tape drives may disrupt communications on the SCSI bus.

To reset the library, you can use one of the following methods:

- Press Reset on the operator panel, then press Enter at the confirmation screen (or press Escape to cancel).
- Perform a power-on reset by powering the library off, then back on.
- Perform a remote hardware reset by plugging a cable into the remote reset port on the back of the library and press a reset button on the cable. (See Appendix A for more information.)

Note: The library, tape drives, or the entire SCSI bus can also be automatically reset by the host.

When the library is reset, both the library and tape drives perform power-on self-tests. Then the Main Screen appears on the LCD.

5 Tape Drive Operation

The application software automatically controls the tape drives to perform backup and restore operations. You do not need to intervene in the cartridge processing; however, you may need to perform the following tasks:

- Monitoring the tape drive LEDs
- Cleaning the tape drives
- Displaying information about tape drives
- Ejecting a cartridge manually

Note: You cannot control the tape drives from the operator panel. However, you can perform diagnostics on the tape drives across the 9-pin or 25-pin serial port. (See Chapter 7 for information about diagnostics.)

Monitoring the tape drive LEDs

The following tables show the tape drive LED states and the conditions they indicate.

Eliant 820 LED state	Condition
All LEDs on	Power-on self-test.
Top and bottom LEDs flashing (middle LED may be flashing)	Cleaning required.
Top LED flashing (bottom LED off)	Hardware error.
Middle LED flashing	SCSI bus activity.
Bottom LED on	A tape is loaded, and the tape drive is ready to perform tape motion activities.
Bottom LED flashing (top LED off)	Tape motion. A fast flash indicates high-speed tape motion.

Mammoth LED state	Condition
All LEDs on	The tape drive was reset or it is performing its power-on self-test.
Top LED on	Cleaning required.
Top LED flashing	Hardware error.
Middle LED on	A tape is loaded, and the tape drive is ready to perform tape motion activities.
Bottom LED flashing	Tape motion. A fast flash indicates high-speed tape motion.

Note: You may observe other LED activity (random flashing, steady on, and so on). For a detailed description, refer to the product specification for your library.

Cleaning the tape drives

You should clean a tape drive whenever the library displays "Drive needs cleaning" on the Main Screen of the LCD or whenever your application software notifies you. (Not all software applications display cleaning requirements.) Regular cleaning helps ensure that the tape drives function reliably.

Note: Some applications monitor the tape drives' cleaning needs and automatically insert the cleaning cartridge in the drive whenever it needs cleaning. If this is the case, you can skip the cleaning instructions in this section.

Selecting cleaning cartridges

If you are using Exabyte Mammoth tape drives, use an Exabyte Mammoth Cleaning Cartridge or a cleaning cartridge approved by Exabyte for use with Mammoth.

If you are using Eliant 820 tape drives, use an Exabyte Premium 8mm Cleaning Cartridge, or a cleaning cartridge approved by Exabyte for use with the Eliant 820 tape drive.

To order cleaning cartridges, contact Exabyte (see page 10).

CAUTION

Use only cleaning cartridges approved by Exabyte for your tape drive. Using cloth swabs, cotton swabs, cleaning agents, or cleaning cartridges not approved by Exabyte may void the tape drive warranty.

Cleaning the tape drives from the operator panel

To clean the tape drives from the operator panel:

1. Determine which drive needs cleaning by looking at the drive LEDs. For Mammoth tape drives, the top LED turns on when cleaning is required. For Eliant 820 tape drives, the top and bottom LEDs flash rapidly. (Depending on SCSI bus activity, the middle LED may also be flashing.)

   Note: When you insert an AME cartridge into an Exabyte Mammoth tape drive after reading MP tape, the top LED illuminates and the cartridge is ejected. Before you can use the AME cartridge, you must clean the tape drive.

2. Make sure you have a cleaning cartridge in the fixed cartridge slot. If the fixed cartridge slot contains a data cartridge instead of a cleaning cartridge, the tape drive will not be cleaned and you will have to manually eject the data cartridge from the tape drive (see page 92).

   If there is no cleaning cartridge in the fixed cartridge slot, use the Insert Cartridge option on the Maintenance Menu to insert a cleaning cartridge into the library's fixed cartridge slot (see page 76).

3. If security has been enable, disable it (see page 60).

4. Change to LCD Interface control mode (see page 67).

5. From the Main Menu, select Maintenance Menu. Then select the Clean Drives Menu.

6. Use ↓ to select the tape drive you want to clean as described below, and press Enter.

   - Clean Drive 1 (top tape drive)
   - Clean Drive 2 (second from top)
   - Clean Drive 3 (third from top)
   - Clean Drive 4 (bottom tape drive)

   When you select a tape drive, the following activities occur:

   - The CHM picks the cleaning cartridge from the fixed cartridge slot and inserts it in the tape drive you specified.
   - The tape drive automatically performs the cleaning process and ejects the cartridge when the process is complete (several minutes).
   - The CHM picks the cartridge from the tape drive and replaces it in the fixed cartridge slot.

7. Confirm that the cleaning was done by looking at the LEDs on the front of the tape drive. For Mammoth tape drives, the top LED should be off. For Eliant 820 tape drives, the top and bottom LEDs should be off. If the LEDs are still on, replace the cleaning cartridge and clean the tape drive again. If the LEDs are still on after the second cleaning, there may be a problem with the tape drive.

   ➤ **Important** If the tape drive ejects the cleaning cartridge within a minute, you need to replace the cartridge. See page 73 for cartridge replacement instructions.

8. When the library is complete, return the library to its original control mode and enable security.

Replacing the cleaning cartridge

To replace the cleaning cartridge when it is used up, use the Remove Cartridge and Insert Cartridge options on the Maintenance Menu and the entry/exit port. Set the source and destination to 0, which is the element index of the fixed cartridge slot. (See page 73 for complete instructions.)

➤ **Important** If you are using Exabyte Mammoth tape drives, use an Exabyte Mammoth 8mm Cleaning Cartridge (or a cleaning cartridge approved by Exabyte for use with Mammoth).

If you are using Eliant 820 tape drives, use an Exabyte Premium 8mm Cleaning Cartridge (or an 8mm cleaning cartridge approved by Exabyte for use with your tape drive).

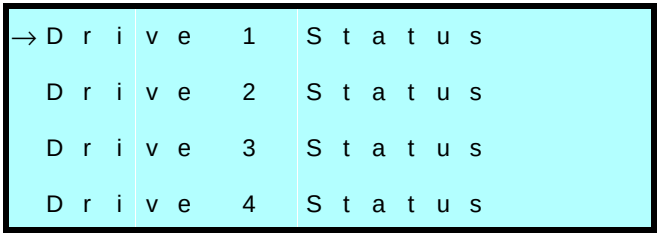
The Mammoth tape drive ejects all other 8mm cleaning cartridges, and the Eliant 820 tape drives eject the Mammoth 8mm Cleaning Cartridge.

Displaying information about tape drives

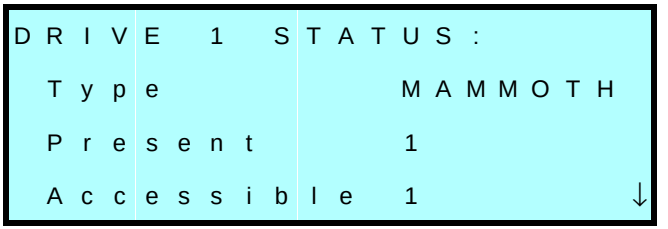
From the operator panel, you can display information about the tape drive, including the type of tape drive installed and its operational status. The information screens are updated whenever there is a change in drive status.

To display tape drive information:

1. From the Main Menu, select the Library Info Menu. Then select the Drive Info Menu. The following screen appears:



2. Press ↑ or ↓ to select the desired tape drive and press Enter. A Drive Status screen appears, similar to the following:



3. Press Escape to return to the previous menus.

The following table describes the information in the Drive Status screen.

Drive Status screen	
DRIVE *N* STATUS	Identifies the tape drive, as follows: DRIVE 1 – The top tape drive DRIVE 2 – The second from top tape drive DRIVE 3 – The third from top tape drive DRIVE 4 – The bottom tape drive
Type	Identifies the tape drive model. This information is updated at power-up and after a reset. If "8mm" appears, it indicates one of the following conditions: ▪ No tape drive is present in this slot. ▪ A non-Mammoth tape drive is using downlevel firmware that cannot send status indicators to the library. (For non-Mammoth tape drives, you must have firmware level 8SC-0793 or above to obtain tape drive information.) ▪ An Exabyte Mammoth tape drive is installed, but the Use Mammoth configuration option is set to OFF. ▪ A tape drive firmware error has occurred.
Present	Indicates whether a tape drive is installed in this slot. 0 – A tape drive is not present. 1 – A tape drive is present.
Accessible	Indicates the accessibility of the tape drive to the CHM. 0 – A cartridge is loaded in the tape drive or the tape drive's status is unknown. 1 – A cartridge is protruding from the tape drive or the drive is empty.
Clean	0 – The tape drive is clean. 1 – The tape drive needs to be cleaned or the cleaning tape is used up.
Warning	Not currently used.

Drive Status screen *(continued)*	
Occupied	0 – There is no cartridge loaded in the tape drive. 1 – There is currently a cartridge loaded in the tape drive.
Occ Valid	0 – The door has been opened or some other interruption has occurred so the occupied information may not be reliable. 1 – The occupied information is reliable.

The following table shows additional fields on the Mammoth Drive Status screen.

Mammoth Drive Status	
Cart	Displays the status of a data cartridge, if any, in this tape drive. ▪ Loaded – A cartridge is in the tape drive and the tape is loaded into the tape path. ▪ Loading – A cartridge is being loaded into the tape drive. ▪ Unloading – A cartridge is being unloaded from the tape drive. ▪ Present – A cartridge is in the tape drive, but the tape is not loaded in the tape path. ▪ Empty – The tape drive does not contain a cartridge.
Tape left	Displays how much tape is left, in megabytes, on the cartridge currently in the tape drive.
Tape size	Displays the total amount of tape, in megabytes, on the cartridge currently in the tape drive.
Tape fmt	Displays the data format of the cartridge currently in the tape drive.
PO Sec	Displays the power-on seconds.
Mo. Sec	Displays the tape motion seconds.
Serial	Displays the tape drive's serial number.
BOOT	Displays the code level of the tape drive's boot ROM.
FLASH	Displays the code level of the tape drive's flash EPROM.

Mammoth Drive Status *(continued)*	
ENTER = LCD Display	Allows you to switch to Mammoth LCD display mode by pressing Enter. When you do so, the third line of the library's LCD shows additional information that would be displayed on the tape drive's LCD. To return to the Drive Status screen from Mammoth LCD display mode, press Escape.

Ejecting a cartridge manually

If a problem occurs that requires intervention, you may need to eject a cartridge manually:

1. Insert the key in the lock, push in, and turn it one quarter turn to the right.

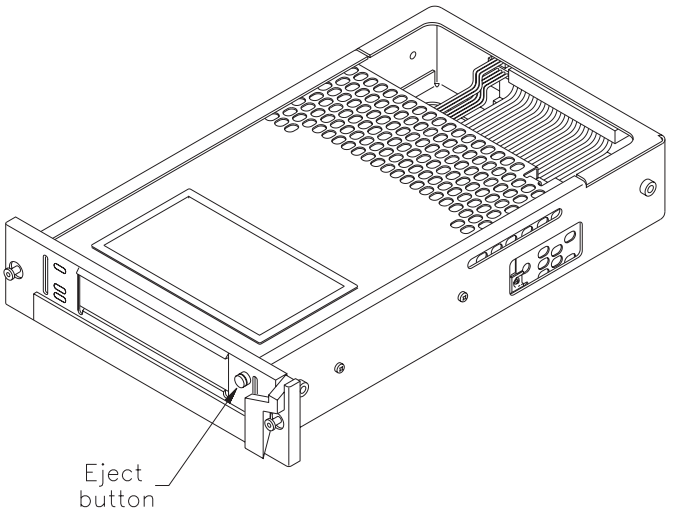
2. When the door's interlock mechanism releases, open the door.

> **CAUTION**
>
> Do not force the door open. The door's interlock mechanism may be prevented from releasing by LCD security or by the application software.

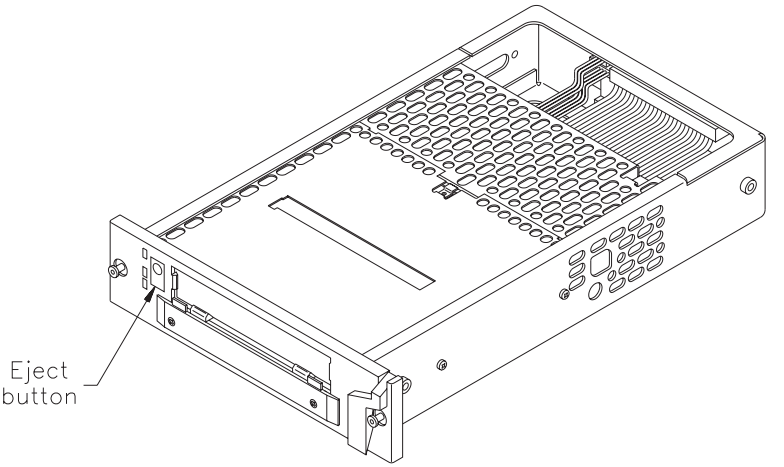
3. Press the eject button on the tape drive's faceplate.

The following figures show the location of the eject button on the Eliant and Mammoth tape drives.

Mammoth



Eliant 820



Notes

6 Library Information

The functions in the Library Info Menu are mainly for use by technical support and application developers. You may be asked by technical support to display one of these screens and locate information that will help troubleshoot a problem.

This chapter describes the following library information:

SCSI Menu. Contains SCSI mode parameters, reservations, and sense data (see page 96).

Statistics. Contains data about CHM operations and elements (see page 102).

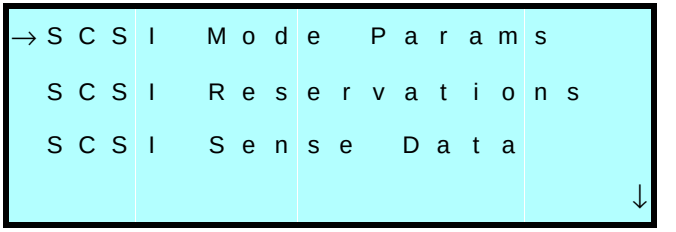
System sensors. Contains information about the library's mechanical sensors (see page 104).

Command history. Displays the contents of the history buffer (see page 106).

Inventory Menu. Contains information about bar code label and elements (see page 108).

Viewing SCSI data

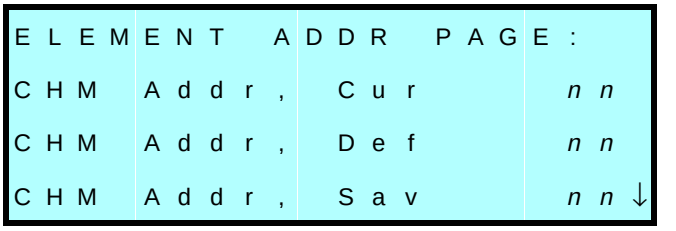
SCSI information is available through the SCSI Menu. To display this menu, select Library Info Menu from the Main Menu, then select SCSI Menu. The following menu appears:



SCSI mode parameters

The SCSI Mode Parameters screen displays the settings of various operating mode parameters. These parameters are equivalent to the parameters reported by the library in response to a MODE SENSE command, issued by the application software. Typically, the values of these parameters are changed by a MODE SELECT command. For more information about the MODE SENSE and MODE SELECT commands, refer to the *EXB-440 and EXB-480 8mm Libraries SCSI Reference*.

To view these parameters, select SCSI Mode Params from the SCSI Menu. The following screen appears:



For each parameter, the SCSI Mode Parameters screen shows the current (Cur), default (Def), and saved (Sav) values:

- The *current* value is the value currently active. It is either the power-on default or a temporary value set by the latest MODE SELECT command.
- The *default* value is the original value set at the factory.
- The *saved* value is the value specified as the power-on default by a MODE SELECT command. After a saved value has been specified with a MODE SELECT command, this value takes effect each time you power on the library.

The table below describes the items on the SCSI Mode Parameters screen.

SCSI mode parameters	
CHM Addr*	The element address of the cartridge handling mechanism (CHM).
Stor Addr*	The element address of the first storage location, which is the fixed cartridge slot. See Appendix D for the complete numbering scheme.
DriveAddr*	The element address of the first tape drive (the top tape drive). The remaining tape drives are numbered consecutively.
Drive Num	The number of tape drives installed.
E/E Addr*	The element address of the entry/exit port.
Parity	Whether parity checking is enabled for the SCSI bus that is connected to the library. When the parity option is enabled, the library checks all data coming across the SCSI bus for parity.
Pty Retry	The number of times the library will retry a SCSI phase after detecting a parity error.

SCSI mode parameters *(continued)*	
Security	Whether the security has been enabled by SCSI. For more information about SCSI security, see the *EXB-440 and EXB-480 8mm Libraries SCSI Reference.* **Note:** Security can also be enabled from the LCD. For more information, see page 58.
Write Line 1 *through* Write Line 4	Whether the text displayed on each of the four lines on the Main Screen is defined by the LCD Mode page in SCSI. For more information, see the *EXB-440 and EXB-480 8mm Libraries SCSI Reference.*

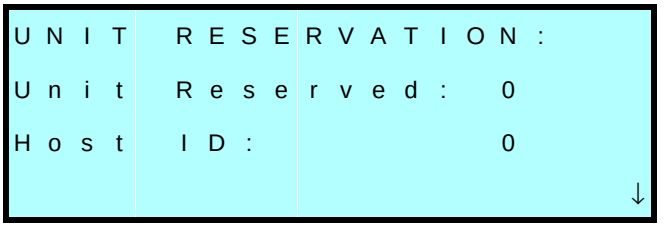
* When set to their default values, the element addresses reported on this screen are the same as the element indexes shown in Appendix D. However, unlike element indexes, which cannot be changed, addresses can be changed by the application software using a MODE SELECT command.

SCSI reservations

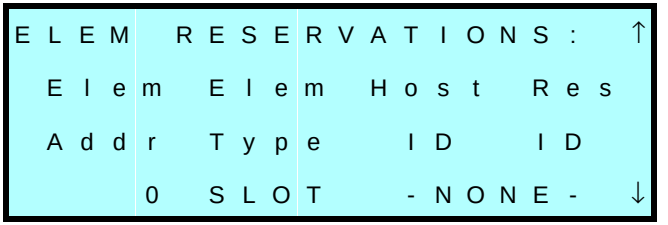
The SCSI Reservations screen indicates if the library or its elements are reserved for exclusive use by a host computer. The library and its elements are reserved and released through SCSI commands (RESERVE and RELEASE).

You may want to view SCSI reservations if you are operating the library in a multi-host environment and you want to determine which elements are reserved by which host. Multiple hosts can reserve different elements within a single library. For example, one host may reserve cartridge slots 1 through 10 for its exclusive use, while a second host may reserve slots 11 through 20. To view SCSI reservations:

1. Select SCSI Reservations from the SCSI Menu. The Unit Reservation screen appears.



2. To display the Element Reservations screen, press ↓ to scroll past the last item in the Unit Reservation screen.



3. To view other elements, press ↑ and ↓. To return to the SCSI Menu, press Escape.

The information in the SCSI Reservations screen is described in the following table.

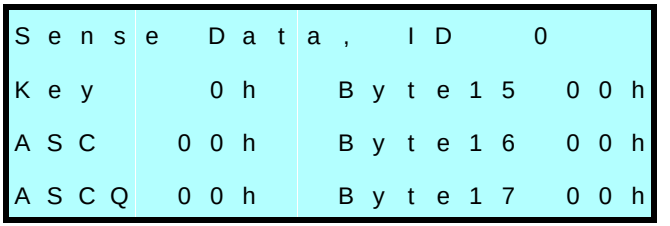
Unit reservations	
Unit Reservation	The library's reservation status (1 if it is reserved or 0 if it is not) and the host's ID, if the library is reserved.
Elem reservations	
Elem Addr	The address of the element.
Elem Type	The category of elements. There are three categories: CHM, Drive, and Slot.
Host ID	The SCSI ID of the host that currently has the element reserved.
Res ID	The ID that the element is reserved under. This is a number assigned to the element by a host when the reservation was made. If there is no reservation, the Res ID and Host ID columns display "-NONE-."

SCSI sense data

When an error or change of state occurs, the application software can issue a SCSI REQUEST SENSE command to the library to obtain information. Some of this information, called *sense data*, is displayed on the SCSI Sense Data screen. Sense data provides information to help diagnose problems with the library. For more detailed information about SCSI sense data, refer to the *EXB-440 and EXB-480 8mm Libraries SCSI Reference*.

To view the sense data:

1. Select SCSI Sense Data from the SCSI Menu. The following screen appears:



   The ID at the top of the display is the SCSI ID of the host that the sense data is being held for. (Note that sense data is supplied for inactive IDs as well as active IDs.)

2. To view other devices, press ↑ and ↓. To return to the SCSI Menu, press Escape.

The following table describes the information in the Sense Data screen.

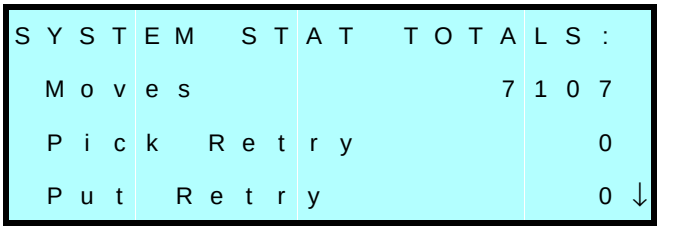
Sense data	
Key	This is the sense key returned by the REQUEST SENSE command. The sense keys are: **0h-No Sense** There is not specific sense key information to report. **2h-Not Ready** The library is not ready to perform motion commands. **4h-Hardware Error** The library detected a hardware failure during a self-test or while performing a command. Operator intervention may be required. **5h-Illegal Request** There was an illegal parameter in the command descriptor block or in the additional parameters supplied as data for a command, or the library is in the wrong mode to execute the command. **6h-Unit Attention** The cartridge inventory may have been violated. **Bh-Aborted Command** The library aborted the command. The initiator may be able to recover by trying the command again.

Sense data *(continued)*	
ASC	This is the additional Sense Code, which along with the Additional Sense Code Qualifier, provides information describing a specific error condition.
ASCQ	This is the Additional Sense Code Qualifier, which along with the Additional Sense Code, provides information describing a specific error condition.
Byte 15	This is the Sense Key Specific data, which provides additional information about an error condition. This information is valid only for the Illegal Request (5h) sense key.
Byte 16	This is the first byte of the Field Pointer data. It indicates which byte in the command had an error. This information is valid only for the Illegal Request (5h) sense key.
Byte 17	This is the second byte of the Field Pointer data. This information is valid only for the Illegal Request (5h) sense key.

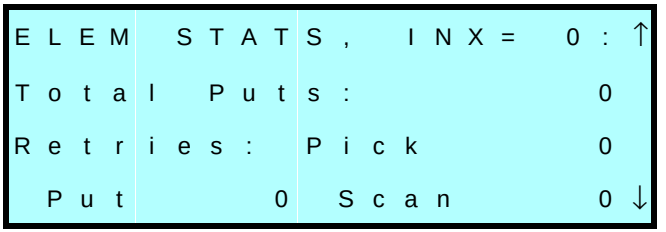
Viewing statistics

The Statistics Menu contains two selections: one for reviewing information about CHM movements and one for reviewing information about elements. To view statistics:

1. Select Library Info Menu from the Main Menu, then select Statistics. The System Statistics screen appears:



2. To display the Element Statistics screen, press ↓ to scroll past the last item on the System Statistics screen.



The following table describes the information in the Statistics screen.

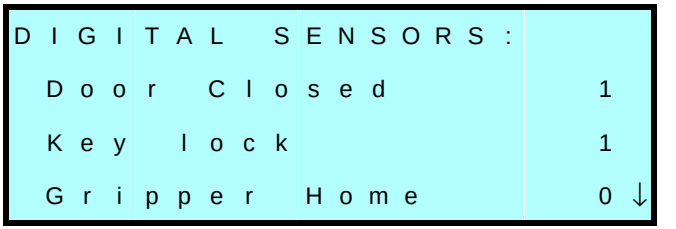
System statistics	
Moves	The number of times the CHM has picked a cartridge and placed it in a slot or tape drive.
Pick Retry	The number of times the CHM retried picking a cartridge.
Put Retry	The number of times the CHM retried placing a cartridge.
D1 DblPiks *through* D4 DblPiks	The number of time the CHM had to pick twice to grab a cartridge from the tape drive.
Scans	The number of times the library scanned a bar code label.
Scan Retry	The number of times the library retried scanning a bar code label.
Scan Fail	The number of times the library failed to scan a bar code label. The library tries to scan a bar code several times before it logs a failure.
E/E Cycles	The number of times the entry/exit port has been extended and retracted.
Element statistics	
Total Puts	The number of times a cartridge was placed in that element since the library was powered on.
Retries: Pick	The number of times the library retried picking a cartridge from that element.

Element statistics *(continued)*	
Retries: Put	The number of times the library retried placing a cartridge in that element.
Retries: Scan	The number of times the library retried scanning that element.

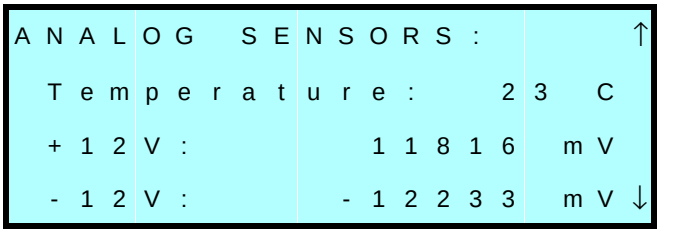
Viewing system sensors

The System Sensors screens enable you to troubleshoot hardware problems by checking the current status of the library's internal mechanical sensors. To view system sensors:

1. Select Library Info Menu from the Main Menu, then select System Sensors. The Digital Sensors screen appears:



2. To display the Analog Sensors screen, press ↓ to scroll past the last item on the Digital Sensors screen.



3. To view other elements, press ↑ and ↓. To return to the SCSI Menu, press Escape.

The following table describes the information in the System Sensors screens.

Digital system sensors	
Door Closed	Indicates whether the front door is closed (1) or open (0).
Key Lock	Indicates whether the front door is locked (1) or unlocked (0).
Gripper Home	Indicates whether the gripper is located in its home position (1) or not (0). The gripper is in its home position when the gripper fingers are open.
Cart Seated	Indicates whether the cartridge is seated in the CHM (1) or not (0).
Drum Axis Home	Indicates whether the drum is in its home position (1) or not (0).
E/E Port Home	Indicates whether the entry/exit port is in its home position (1) or not (0).
E/E Port Limit	Indicates whether the entry/exit port is almost fully extended (1) or not (0).
Analog system sensors	
Temperature	Indicates the temperature of the library in degrees Celsius.
+ 12V	Indicates the output of the + 12-volt power supply in millivolts.
– 12V	Indicates the output of the -12-volt power supply in millivolts.
+ 24V	Indicates the output of the + 24-volt power supply in millivolts.

Viewing command history

The Command History screen displays the most recent 300 events that have occurred in the library. You may be asked by a technical support person to scroll through this display looking for particular events.

To display the Command History screen:

1. Select the Library Info Menu from the Main Menu, then select Command History. The following screen appears (your screen may be slightly different):

```
000 MOVE      19:37:45
   Move from 8 to 82
complete
1861 06-27-99 00441
```

2. Scroll through the buffer by pressing ↑ and ↓.

3. To exit the Command History screen, press Escape.

The following table briefly describes the Command History screen. For complete details, refer to the History Buffer Display in *Exabyte 440 and Exabyte 480 Maintenance.*

Shown in sample	Field name	Description
000	IDX (Index)	The line number of this event in the command history. The range is 000 (the most recent event) through 299. The most recent event is displayed first.
MOVE	From	The process that logged this event.
19:37:45	Time	The time the event took place, according to the library's internal clock.
Move from 8 to 82 complete	Description	Description of the event.
1861	Line	The line number of the source code that logged this event.
06-27-99	Date	The date that the event took place, according to the library's internal calendar.
04441	Seq	The sequence number of this event across all system buffers.

Viewing inventory information

The library maintains a cartridge inventory in nonvolatile RAM and uses the information to process SCSI commands from the application software. The inventory contains information about the following element locations:

- CHM (the medium transport element)
- Entry/exit port (the import/export element)
- Cartridge slots (the storage elements)
- Tape drives (the data transfer elements)

The Inventory Menu allows you to display the following information:

- **Bar code label information.** This includes data about whether the bar code scanner could accurately scan the label.

- **Element occupied information.** This includes data about whether the element contains a cartridge and whether a magazine or tape drive is installed.

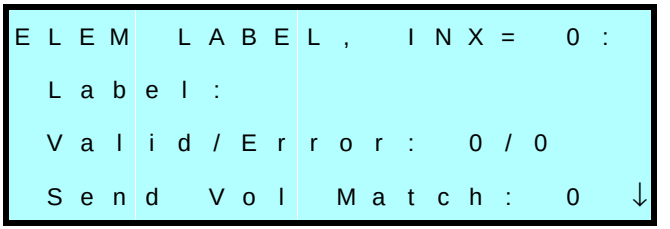
- **Element position information.** This includes data about the exact position of each element.

Bar code label information

To display bar code label information:

1. Select the Library Info Menu from the Main Menu, then select Inventory Menu.

2. From the Inventory Menu, select Label Information. The following screen appears:



3. Press ↓ to view a higher element index; press ↑ to view a lower element index.

The following table describes the fields on the Element Label screen.

Element label	
INX	Indicates the element index for which information is being displayed.
Label	If the element location contains a cartridge with a scanned bar code label, the Label field displays the cartridge label.
Valid	Indicates whether the Label field is accurate: 0 – The Label field is not accurate. 1 – The Label field is accurate.

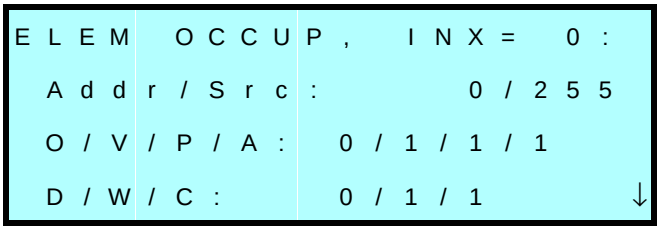
Element label *(continued)*	
Error	Indicates whether the bar code scanner was unable to read the cartridge label: 0 – The bar code scan was successful, a reset condition occurred, or the door was opened. 60 – The bar code scanner could not read the bar code label because there was no label on the cartridge. 61 – The bar code scanner could not read the bar code label because the label was unreadable. 62 – The bar code scanner could not read the label because the magazine or tape drive is not installed. 65 – The bar code scanner could not read the bar code label because a Direct Memory Access overrun occurred. 67 – The bar code scanner could not read the bar code label because DMA channel 2 timed out. 69 – The bar code scanner could not read the bar code label because the label was upside down or misplaced.
Send Vol Match	Indicates whether the cartridge label matched the template sent with the last SEND VOLUME TAG SCSI command: 0 – The label did not match the template. 1 – The label matched the template.

Element occupied information

To display information about elements in the library:

1. Select the Library Info Menu from the Main Menu, then select Inventory Menu.

2. From the Inventory Menu, select Occupied Info. The following screen appears:



3. Press ↓ to view an element with a higher index; press ↑ to view an element with a lower index.

The following table describes the fields in the Occupied Info screen.

Occupied Info screen	
INX	Indicates the element index for which information is being displayed.
Addr (Address)	Indicates the SCSI address of this element.
Src (Source)	Indicates the index of the last storage element from which the cartridge was moved.
O (Occupied)	Indicates whether the library considers the specified element location to contain a data cartridge: 0 – The element location does not contain a data cartridge. 1 – The element location contains a data cartridge.
V (Occupied Valid)	Indicates whether the Occupied flag is accurate: 0 – The Occupied flag is questionable (may not be accurate). 1 – The Occupied flag is accurate.

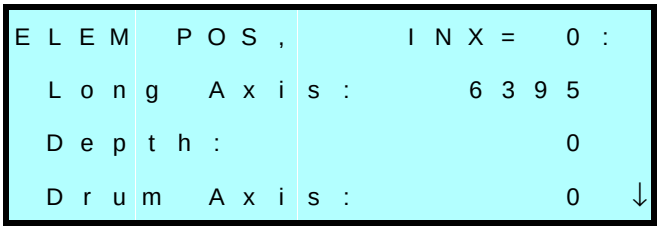
Occupied Info screen *(continued)*	
P (Cartridge Magazine or Tape Drive Present)	Indicates whether a specific magazine or tape drive is installed. If the element index references a storage element, this flag indicates whether that particular magazine is installed. If the element index references a tape drive, this flag indicates whether that particular drive is installed. 0 – Not installed. 1 – Installed. **Note:** This flag is not used for the CHM or the entry/exit port.
A (Tape Drive Accessible)	Indicates whether a drive is empty, a cartridge is loaded in the drive, or the cartridge is ejected: 0 – A cartridge may be loaded in the drive. 1 – The drive is empty, or the cartridge is ejected and ready to be picked.
D	Indicates whether the element is a tape drive: 0 – The element is not a tape drive. 1 – The element is a tape drive.
W	Not currently used.
C	Indicates whether the element has been calibrated: 0 – The element has not been calibrated. 1 – The element has been calibrated.

Element position information

To display information about the position of elements in the library:

1. Select the Library Info Menu from the Main Menu, then select Inventory Menu.

2. From the Inventory Menu, select Position Info. The following screen appears:



3. Press ↓ to view an element with a higher index; press ↑ to view an element with a lower index.

The following table describes the fields in the Position Information screen.

Position Information screen	
INX	Indicates the element index for which information is being displayed.
Long Axis	Indicates the distance (in thousandths of an inch) the CHM has to move along the long axis from its home position to the specified element location.
Depth	Indicates the distance the CHM has to move along the short axis from its home position to touch the magazine or a cartridge in the magazine. (This field is not used for the tape drives, CHM, or entry/exit port.)
Drum Axis	For storage elements, this element's rotational position on the drum.

Notes

7 Hardware Exercises

This chapter describes hardware exercises you can perform from the operator panel:

- Performing diagnostics on the library
- Configuring ports for diagnostics

Many of the tasks described in this chapter may be necessary if you want to troubleshoot library hardware operations.

Performing diagnostics

This section describes how to perform diagnostics using the Demo Menu and Diagnostics Menu from the operator panel. Both of these menus are available from the Maintenance Menu. The Demo Menu provides options for running the library in a continuous demo mode, where the CHM randomly moves cartridges between slots and tape drives. The Diagnostics Menu provides options for performing specific CHM movements.

Note: You can also perform diagnostics using the library's resident diagnostic program (see page 124). This program also allows you to upgrade to new library firmware and print a diagnostic listing. For information, see *Exabyte 440 and Exabyte 480 Maintenance*.

Using the Demo Menu

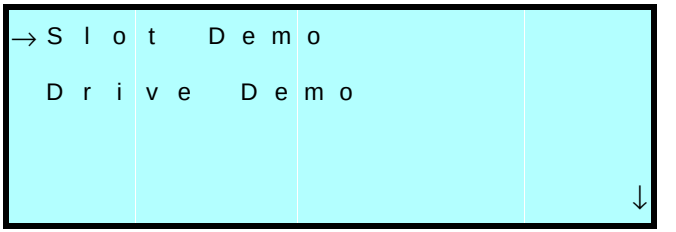
The Demo Menu includes two selections:

- **Slot Demo**. This option causes the CHM to randomly move cartridges from slot to slot, including the fixed cartridge slot.
- **Drive Demo**. This option causes the CHM to randomly move cartridges between magazine slots, the fixed cartridge slot, and the tape drives.

Starting a demo option

Before running a demo option:

1. If necessary, disable security (see page 60).
2. Change the control mode to LCD Interface (see page 67).
3. Make sure there is at least one data cartridge present and one empty slot before you begin the test.
4. From the Main Menu, select Maintenance Menu. Then select Demo Menu. The following menu appears:

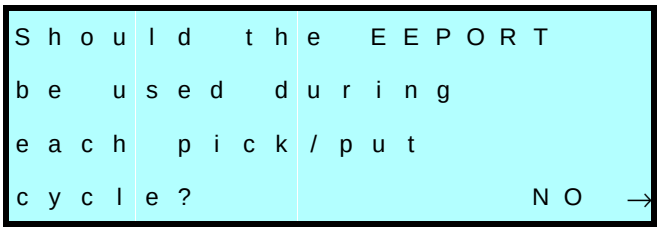


Slot Demo

To run the slot demo:

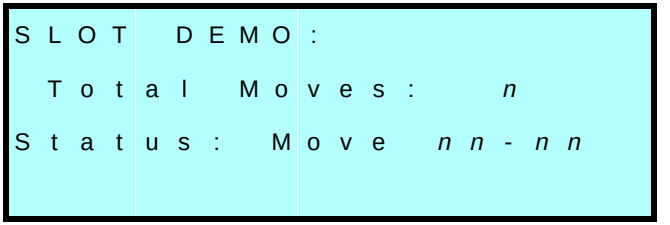
1. Select Slot Demo from the Demo Menu.

2. The library asks if you want cartridges scanned during the demo. If you want to include bar code scanning in your demo, select YES. Otherwise, select NO. The library displays the following prompt:



3. If you want the entry/exit port to be used during each pick and place cycle, select YES. Otherwise, select NO.

   The library begins the demo cycle and displays the following screen:



   In the example above, *n* indicates the number of moves that have completed, and *nn - nn* indicates the source and destination element indexes of the current move.

4. To stop the demo, press Escape, then Enter at the next screen. The library displays the total number of cycles that were run during the demo and an Error 91 message, indicating that you have stopped the demo.

Drive Demo

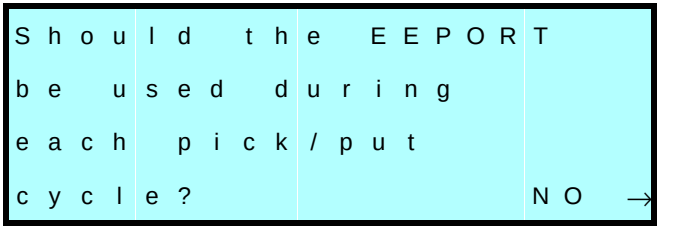
To run the drive demo:

1. Select Drive Demo from the Demo Menu.

2. The library asks if you want cartridges loaded into the tape drives during this demo. Select NO. The CHM will insert the cartridge into the drive slot, but will not push the cartridge all the way into the drive.

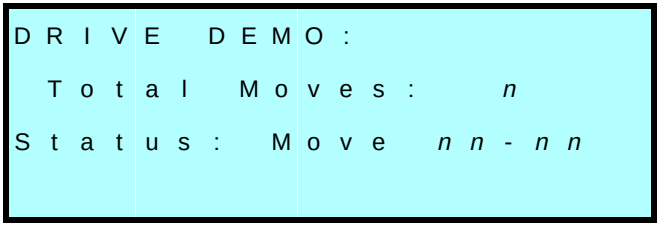
> ➤ **Important** Do not select YES. If you do, the CHM will push the cartridge all the way into the drive and the tape drive will not automatically eject the cartridge.

3. The library then asks if you want cartridges scanned during the demo. If you want to include bar code scanning in your demo, select YES. Otherwise, select NO. The library displays the following prompt:



4. If you want the entry/exit port to be used during each pick and place cycle, select YES. Otherwise, select NO.

   The library begins the demo and displays the following screen:



   In the example above, *n* indicates the number of moves that have completed, and *nn - nn* indicates the source and destination element indexes of the current move.

5. To stop the demo, press Escape, then Enter at the next screen. The library displays the total number of cycles that were run during the demo and an Error 91 message, indicating that you have stopped the demo.

Using the Diagnostics Menu

The Diagnostics Menu provides basic exercising functions for components in your library. You can use these functions to test the hardware after installation.

Starting diagnostics

Before performing diagnostic exercises from the operator panel, do the following:

1. If necessary, disable security. See page 60.

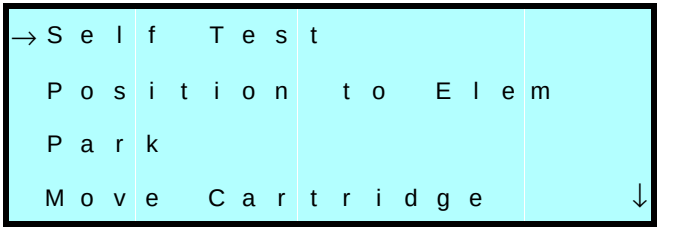
2. Change to LCD Interface control mode. See page 67.

3. Refer to the table below for the element indexes. These numbers correspond to the library components and are necessary for some tests.

Library component	Element index
Fixed cartridge slot	0
Cartridge slots	Exabyte 440: 1 to 40 Exabyte 480: 1 to 80 (See Appendix D for entire numbering scheme.)
Tape drive 1	82
Tape drive 2	83
Tape drive 3	84
Tape drive 4	85
CHM	86
Entry/exit port	81

Performing diagnostic tests

1. From the Main Menu, select Maintenance Menu, then select Diagnostics Menu. A screen of diagnostics tests appears:



2. Select one of the tests. (Each test is described in the following table.)

3. When the test is finished, the screen displays Status Complete and you can press Escape to return to the Diagnostics Menu.

Note: If you want to stop a test in progress, press Escape, then Enter.

The following table describes each test and also provides additional instructions for performing the tests (if applicable).

Diagnostic test	Description	Additional instructions
Self Test	Causes the CHM to cycle the gripper fingers, the short axis, the long axis, and the entry/exit port. The drum assembly rotates and the CHM moves to its home position.	
Position to Elem	Moves the CHM to a tape drive, cartridge slot, or the entry/exit port.	When you select Position to Elem, the Set Destination screen appears. Press ↑ or ↓ to select the element index where you want to position the CHM. Then press Enter.
Park	Moves the CHM to the park position at the bottom of the long axis.	
Move Cartridge	Moves a cartridge from one location to another. **Important:** Do not insert a cartridge in a tape drive. The tape drive will not eject the cartridge.	When you select Move Cartridge, the Set Source screen appears. Press ↑ or ↓ to select the source index (the slot you want the CHM to pick from), then press Enter. The Set Destination screen appears. Press ↑ or ↓ to select the destination index (the slot where you want the CHM to place the cartridge). Then press Enter.

Diagnostic test	Description	Additional instructions
Scan	Scans all of the elements.	After the system scans all the elements, it stores the data in the cartridge inventory and displays any scan errors on the Label Information screen (see page 108).
Scan with Range	Scans a range of bar code labels.	When you select Scan with Range, the Set Scan Start screen appears. Press ↑ or ↓ to specify an element index where you want the scanner to begin, and press Enter. The Set Scan Stop screen appears. Press ↑ or ↓ to specify an index where you want the scanner to stop, and press Enter. After the system scans the labels, it stores the data in the cartridge inventory and displays any scan errors on the Label Information screen (see page 108).
Home Gripper	Causes the gripper to move to its home position (open). This test also recalibrates the home or zero position for the gripper.	
Home CHM	Causes the CHM to move in and out on the short axis, move up and down on the long axis, rotate the drum assembly to its home position (with cartridge magazine 0 to the front), and open and close the gripper. This test also recalibrates the home or zero position for the long axis, the short axis, the gripper, and the drum.	

Diagnostic test	Description	Additional instructions
Cycle Pick/Place	Causes the CHM to take a cartridge from a specified element and replace it in the same location.	When you select Cycle Pick/Place, the Set Source screen appears. Press ↑ or ↓ to select the source index (where you want the CHM to pick and place the cartridge), and press Enter. The Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want this test to run and press Enter.
Cycle Gripper	Causes the CHM gripper to open and close the number of times you specify.	When you select Cycle Gripper, the Set Cycles screen appears. Press ↑ or ↓ to select the cycles for the Cycle Gripper test to run and press Enter.
Cycle S Axis	Causes the CHM to move end to end along the short axis (the axis on which the CHM moves in and out).	When you select Cycle S Axis, the Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want the Cycle S Axis test to run and press Enter.
Cycle L Axis	Causes the CHM to move end to end along the long axis (the axis on which the CHM moves up and down).	When you select Cycle L Axis, the Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want the Cycle L Axis test to run and press Enter.
Cycle Drum	Rotates the drum assembly 180 degrees.	When you select Cycle Drum, the Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want the Cycle Drum test to run and press Enter.
Cycle Solenoid	Exercises the solenoid that controls the locking mechanism on the front door.	When you select Cycle Solenoid, the Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want the Cycle Solenoid test to run and press Enter. You will hear a click each time the solenoid extends and retracts.
Cycle E/E	Extends and retracts the entry/exit port.	When you select Cycle E/E, the Set Cycles screen appears. Press ↑ or ↓ to select the number of cycles you want the Cycle E/E test to run and press Enter.

Configuring the serial ports for diagnostics

You can use one of the library's serial ports and a terminal emulation program (such as CHSTERM) to access the library firmware. The console interface, also referred to as the *Diagnostic Console*, allows you to view information about the library, perform diagnostics tests, create diagnostic listings, and download new firmware.You can also use the library's serial ports to perform diagnostics on the tape drives.

The following table illustrates the functions you can perform using the serial ports. As the table indicates, unless you want to control the motion of the CHM, you do not need to switch to 9-Pin or 25-Pin Port control mode (for narrow libraries) or 25/9 Pin control mode (for wide libraries).

Function	Serial Port		Must change control modes?
	9-Pin	25-Pin	
Controlling the CHM for diagnostic purposes	✔	✔	✔
Upgrading library firmware	✔		
Creating diagnostic listings for the library	✔	✔	
Upgrading tape drive firmware	✔	✔	
Controlling the tape drives for diagnostic purposes	✔	✔	

For detailed information about using the Diagnostic Console and the serial ports, refer to *Exabyte 440 and Exabyte 480 8mm Libraries Maintenance*.

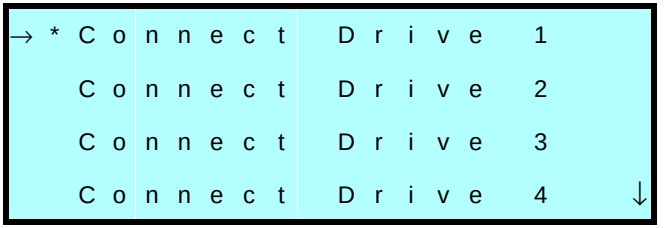
To configure the serial port:

1. If necessary, disable security (see page 60).

2. If you want to control CHM motion, change the control mode to the appropriate serial port mode (see page 67).

> ➤ **Important** Do not change to a serial port control mode if you want to connect a serial port to a tape drive.

3. From the Interface Menu, press ↑ and ↓ to select Config 25-Pin Port or Config 9-Pin Port (for narrow SCSI libraries) or Config 25/9 Pin Menu (for wide SCSI libraries). A screen similar to the following appears:



Note: An asterisk (*) indicates the current connection.

4. Select one of the following options:

   - Connect Drive 1 (the top tape drive)
   - Connect Drive 2
   - Connect Drive 3
   - Connect Drive 4 (the bottom tape drive)
   - Diag Console (connect to the library's resident diagnostic program)

➤ **Important** If you connect a serial port to an Eliant 820 tape drive, you may interrupt any SCSI commands being sent to that drive from the application software.

5. When you have selected the option you want, press Enter. The library configures the port and displays a confirmation message. Press Escape to exit this message.

6. Press ↓ to select a baud rate for the port and press Enter. The library assigns the baud rate and an asterisk (*) indicates the current connection.

   Note: Use 9600 baud to communicate with the tape drive.

   If you connected to a tape drive to perform tape drive diagnostics, be aware that the library changes back to the default setting, Diag Console, after the library door has been opened and closed or after the library has been reset.

➤ **Important** If you attempt to exit the Config Port menu while the library is still connected to a tape drive, the library displays a message that instructs you to change the port setting back to Diag Console.

8 Troubleshooting

This chapter provides a list of suggestions for solving problems that may occur when you are installing and operating the library and the enclosed tape drives. The instructions in this chapter are basic troubleshooting guidelines. For more advanced troubleshooting, contact your service provider.

This chapter is divided into the following sections:

- Problems with library installation
- Problems with tape drive operation
- Problems with library operation

Note: If an error code is displayed on the LCD, refer to Appendix C. If LEDs are flashing on the tape drives, refer to page 84.

Problems with library installation

If your library and application software are not communicating after installation, check the following:

- ✔ **Single-ended, low-voltage differential (LVD), and high-voltage differential (HVD) devices**. Make sure all devices on the bus are all singled-ended or LVD or all HVD. You can connect single-ended and LVD devices to the same bus. However, mixing the two types of devices results in all devices on the bus operating as single-ended devices. These devices include the controller cards, cables, and terminators.

- ✔ **Narrow SCSI and wide SCSI**. Make sure all devices within the library are either narrow SCSI or wide SCSI. Do not mix narrow and wide SCSI devices within the library.

- ✔ **SCSI cable lengths**. Make sure the internal and external SCSI cabling does not exceed maximum lengths (see page 149).

- ✔ **Termination**. Make sure your bus is properly terminated as described in Appendix B. If another SCSI device previously terminated the SCSI bus and is no longer at the physical end of the bus, be sure to remove the terminators from that device.

- ✔ **SCSI bus connections**. Make sure that all SCSI cables and terminators are securely connected to the appropriate SCSI connectors on the back of the library. See page 36 for more information.

- ✔ **SCSI IDs**. Make sure that the SCSI IDs you selected for the tape drives and library are not the same as IDs used by any other SCSI device on that bus, including the SCSI adapter card. The library does not check for duplicate IDs. See page 52 for instructions.

- ✔ **Compatibility**. Make sure that your tape drive and library are compatible with the SCSI adapter card and application software you plan to use.

- ✔ **SCSI adapter card installation**. Make sure that you installed your SCSI adapter card or cards correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay special attention to steps describing setting various jumpers and switches on the card. Make sure that the card is properly seated.

- ✔ **Software installation**. Make sure that your application software is installed correctly. Refer to the documentation that came with your software.

- ✔ **Control mode**. Make certain the library is operating in the correct control mode. When a software application is controlling the CHM, the library must be set to SCSI Interface control mode. See page 67 for more information.

After checking these items, make sure there is no SCSI activity, then press Reset on the operator panel. Retry your operation.

Problems with tape drive operation

If you have been successfully operating the application software and library in the past, but are now experiencing problems reading and writing data, check the following:

- ✔ **Write-protect switch**. If you are writing data, make sure that the cartridge is write enabled. See page 26 for instructions.

- ✔ **Cartridge brand**. Check the brand of cartridge you are using. Use Exatape 8mm data cartridges only. See page 72 for more information.

- ✔ **Cartridge type**. If you are writing data with Exabyte Mammoth tape drives, use AME data cartridges. If you have Eliant 820 tape drives, use MP data cartridges. Because of media management and application software issues, do not mix MP and AME data cartridges in the library. If you must mix cartridge types, contact your application software vendor for assistance.

- ✔ **Cartridge age**. If the cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.

- ✔ **Tape drive cleaning**. Clean the tape drive. See page 85 for instructions. Make sure you are using the recommended cleaning cartridge for your tape drive. See page 88 for details.

✔ **Use Mammoth option**. If you are using Exabyte Mammoth tape drives, make sure that the Use Mammoth configuration option is set to ON, as described on page 66. Otherwise, the library will not be able to receive information from the tape drive. Set the Use Mammoth option to OFF when using the Eliant 820 tape drives.

➤ **Important** If you are using Eliant 820 tape drives, make sure the Use Mammoth option is OFF. If Use Mammoth is ON, you may not be able to read or write data.

Problems with library operation

If the library has been successfully operating in the past, but is now experiencing problems, check the following:

✔ **Control mode**. Make sure the library is operating in the correct control mode. The library must be in SCSI Interface mode for the application software to control CHM motion. See page 67 for instructions.

✔ **Security**. Make sure that security is set correctly for the operation you are trying to perform. If security is on, you cannot perform many operations from the LCD. Security can be set from the LCD with a password or from SCSI by the application software. See page 58 for more information.

✔ **Door open**. Check to make sure that the door is closed and locked. You can check the Door Closed and Key lock lines on the System Sensors screen to determine if the door and key lock sensors are properly working (see page 104).

- ✔ **CHM operation**. You can use the selections in the Diagnostics Menu and the Demo Menu to determine if the CHM is functioning properly. See Chapter 7.

- ✔ **Fuse**. Check to make sure that the fuse is good. See page 135 for instructions.

If you cannot resolve the problem...

If you cannot resolve the problem, call your service provider. Before calling, gather the following information:

- **For the library**: serial number (found on the Serial Number screen on the LCD or on the rear panel), firmware number (found on the Main Screen of the LCD), and SCSI configuration (single-ended, LVD, or HVD, narrow or wide).

- **For the tape drives**: model, serial numbers (found on the top of the tape drive housing) and FECODE and EECODE numbers (found on the top of the tape drive housing). (See page 140 for instructions about removing a tape drive.)

- **For the host computer**: operating system, computer brand name and model, type of host bus adapter card installed, and application software name and version number.

9 Maintenance

This chapter provides information about the following maintenance functions you may need to perform:

- Cleaning the front window
- Using touch-up paint on the library housing
- Replacing the fuse
- Replacing the air filter
- Replacing tape drives or drive blanks

CAUTION

Unless you have a self-maintenance contract with Exabyte, do not attempt to replace any components in the library other than the tape drives, drive blanks, fuse, or air filters. If you do so, you may void your warranty.

The library's internal components are lubricated at the factory and should not be cleaned or re-lubricated. To protect internal components from dust, keep the library door closed and locked.

Cleaning the front window

Aside from the tape drives, the only library component that should be cleaned is the window in the door. Two cleaning packets are provided with your library for cleaning the front window. To order additional cleaning packets, see page 10.

To clean the library's window, use the # 1 wet wipe first, then the # 2 dry wipe.

> **CAUTION**
>
> To avoid scratching the window, do not use abrasive cleaners, abrasive cleaning implements, harsh chemicals, or solvents.

Using touch-up paint on the housing

For standalone models, a pearl-white paint kit is available for touching up nicks and scratches on the finish. For ordering information, see page 10.

Replacing the fuse

The library uses a 4.0-amp, 250-volt fuse, which is located in the fuse drawer at the back of the library next to the power cord connector. An extra fuse is provided in the fuse drawer. To order additional fuses, see page 10.

CAUTION

When replacing the fuse, use only the same type and rating of fuse.

To replace the fuse:

1. Power off the library and remove the power cord.

WARNING!

Before performing any installation or maintenance procedures, be sure that the library power switch is in the off position and that the power cord is disconnected from the library and the outlet.

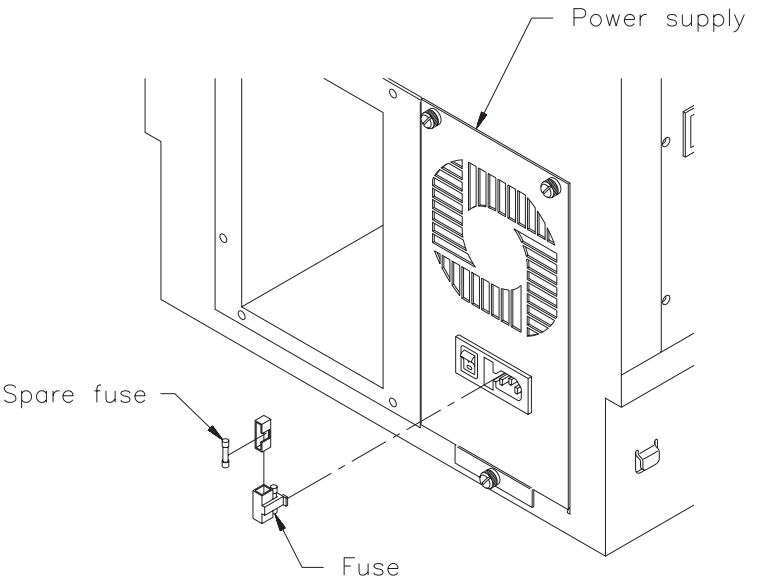
2. Place a small screwdriver underneath the tab on the fuse drawer. Gently lift out the fuse drawer. (See the following figure.)

3. Pull the blown fuse out of the fuse slot, as shown in the following figure.

4. Use the screwdriver to push the spare fuse box out of the fuse drawer. Remove the spare fuse and place it in the fuse slot, as shown in the following figure.

5. If desired, order another spare fuse for the fuse drawer. (See page 10.)

6. Insert the fuse drawer into the back panel and push in until you hear it snap into place. (See the following figure.)



Replacing the air filter

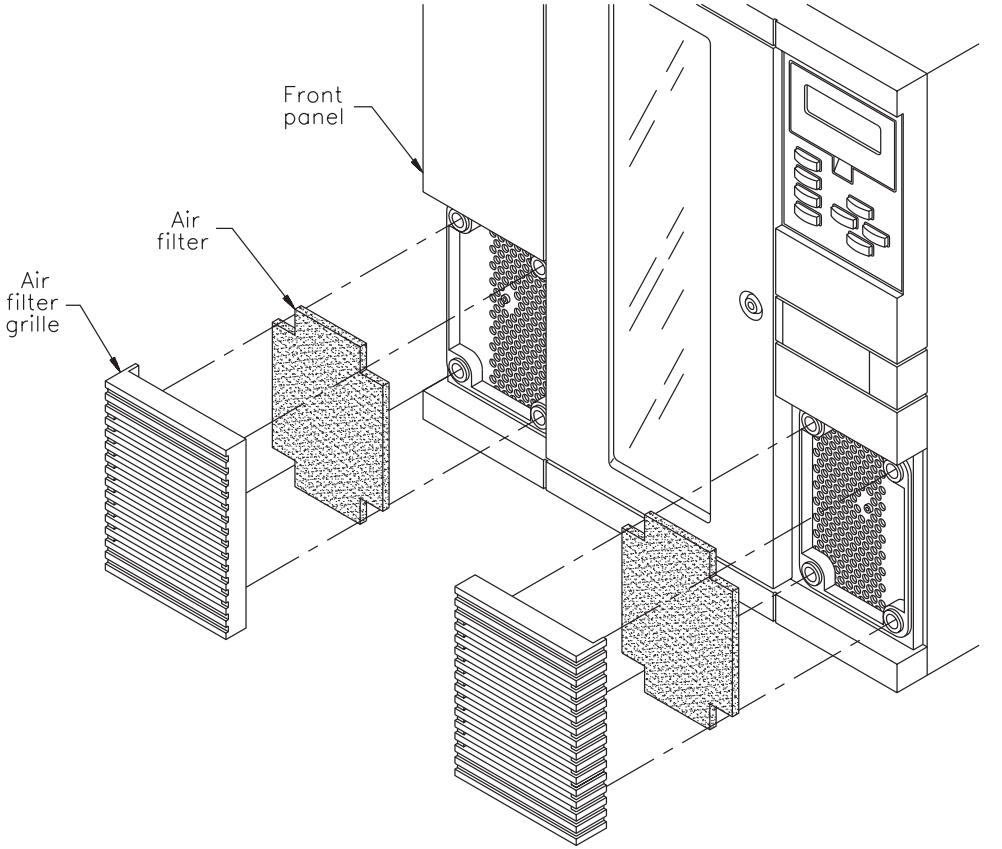
The library has two air filters, one on each side of the front panel. You should replace the air filters once a year (or more frequently if the library is operating in a dirty environment). To order replacement filters, see page 10.

➤ **Important** Air filters protect the library from large contaminants, but are not intended to keep the tape drives clean. To help maintain data integrity and reliability, you should clean the tape drives on a regular basis as described on page 85.

To replace the air filters:

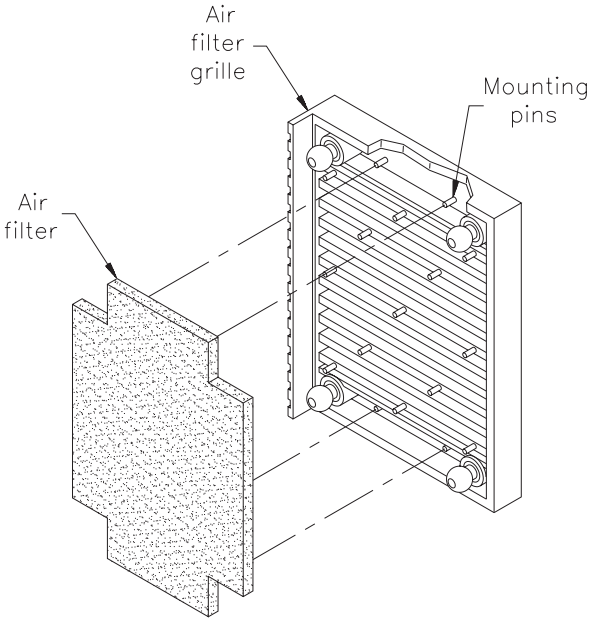
1. Push against the outer edge of each air filter grille and pull the grille off the front panel.

2. Remove the air filter from inside of the air filter grille (see the following figure).



3. Place a new filter inside each grille, tucking the mesh over the mounting pins inside the grille, as shown in the following figure.

4. Replace each grille by inserting the tabs into the holes and pushing against the grille until it is seated.



Replacing a tape drive (or drive blank)

You can install an Exabyte Mammoth or Eliant 820 tape drive into your library.

➤ **Important** You must purchase the tape drive pre-installed in the carrier.

You cannot combine Exabyte Mammoth tape drives with any other type of drive in the same library. However, if you already own an older model library that contains Exabyte 8505XL tape drives, you can combine them with Eliant 820 tape drives.

Note: If you want to upgrade a library containing Eliant 820 or Exabyte 8505XL tape drives to Exabyte Mammoth tape drives, you must obtain an upgrade kit from Exabyte.

Using drive blanks

If you are using fewer than four tape drives, you must install a drive blank in each of the unused drive carrier slots. You cannot operate the library with empty drive carrier slots.

If your library has a narrow SCSI configuration, use the narrow SCSI drive blank. If your library has a wide SCSI configuration, use the wide SCSI drive blank.

Note: The library is shipped with one extra drive blank in the accessory box.

Procedure for replacing a tape drive (or drive blank)

Replacing a tape drive (or drive blank) involves the following steps:

✓	Step	Description
	1	Prepare for replacement procedure.
	2	Remove the tape drive from the library.
	3	Install a drive blank or tape drive in the library.
	4	Resume library operations.

Note: When you order a new tape drive for the library, the tape drive will be shipped to you in a drive carrier. You cannot install a tape drive into the library without a drive carrier.

Step 1 – Prepare for replacement procedure

1. Obtain a flat-blade screwdriver.

2. To avoid damaging the library, be sure that the work area is free of conditions that could cause electrostatic discharge (ESD). If possible, use an antistatic mat and grounded static protection wristband during installation. If a mat and wristband are not available, touch a known grounded surface, such as the computer's metal chassis.

3. Unlock and open the library door (see page 24).

> **CAUTION**
>
> Do not force the door open. The interlock mechanism may be prevented from releasing by LCD security or by the application software.

4. Power off the library.

5. Disconnect the power cord.

> **WARNING!**
>
> Before performing any installation or maintenance procedures, be sure that the library power switch is in the off position and that the power cord is disconnected from the library and the outlet.

6. If necessary, reach in and push firmly against the base of the CHM to move it so it is not blocking access to the tape drives.

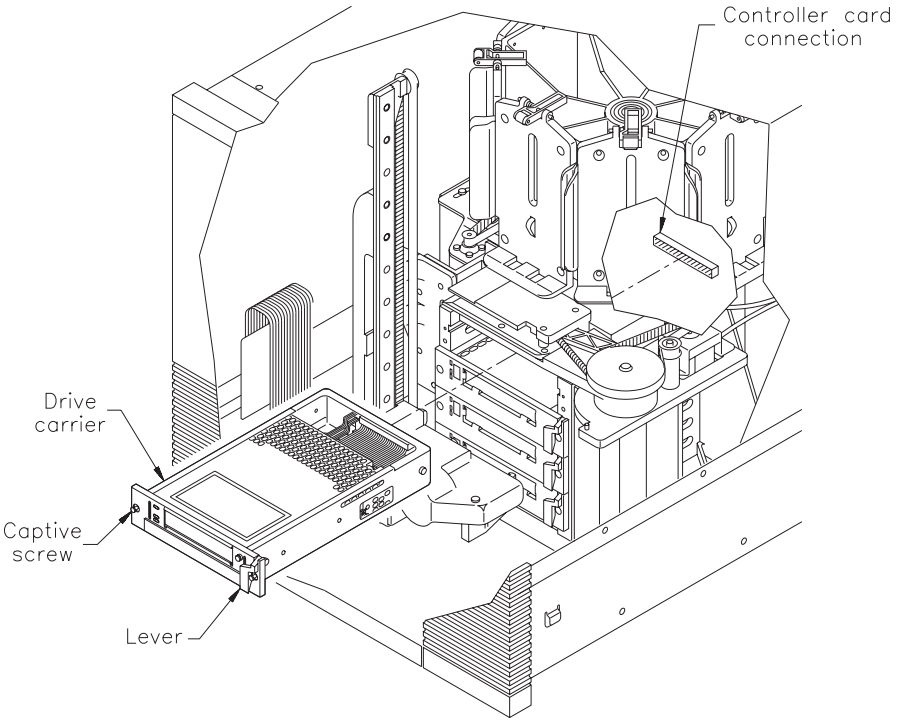
Step 2 – Remove the tape drive

1. Using a flat-blade screwdriver, loosen the two captive screws on the drive carrier faceplate. See the following figure.

2. Using your finger, pull out the lever on the faceplate, as shown in the following figure.

> **CAUTION**
>
> Do not pull out the lever without first loosening the screws.

3. Pull the tape drive out of the slot.



Step 3 – Install the tape drive

➤ **Important** Do not insert your fingers in the tape drive door.

1. As shown in the previous figure, insert the tape drive into the slot with the lever to the right. Make sure the lever is closed. The tape drive should slide easily toward the back.

2. When the drive is almost completely inside the slot, you will feel some resistance. This is caused by the connection between the library's controller card and the tape drive. To seat the connection, push firmly against the drive until you can push no further.

3. Using a flat-blade screwdriver, tighten the captive screw on each end of the drive carrier faceplate (two screws).

Step 4 – Resume library operations

1. Connect the power cord to the back of the library and to the outlet.

2. Close and lock the library's door.

3. Power on the library.

Note: When you replace a tape drive, the new tape drive automatically assumes the SCSI ID of the old tape drive. See page 52 if you want to change the ID.

A Specifications

This appendix provides general specifications for the library.

Storage capacity

The table below summarizes the storage capacity of the library with the different tape drive models.

Type of library	Capacity with the following tape drives and cartridges...*	
	Mammoth with 170m AME data cartridges	Eliant 820 with 160m XL data cartridges
Exabyte 480 with 80 cartridges	3.20 terabytes	1.12 terabytes
Exabyte 440 with 40 cartridges	1.60 terabytes	0.56 terabytes

* Assumes that the tape drives are writing data at a 2:1 compression ratio.

Operating environment

Ambient temperature range	+ 5° C to + 35° C (+ 41° F to + 95° F)
Maximum allowable temperature variation	1° C per minute; max 10° C per hour (2° F per minute; max 18° F per hour)
Relative humidity range	20% to 80%, non-condensing
Wet bulb temperature	26° C (79° F) max
Altitude range	–304.8 m to + 3,048 m (–1,000 ft. to + 10,000 ft.)

Size and weight

Size (rack-mount model)	20.9 high × 17.5 wide × 26.5 long (inches) (53.1 × 44.4 × 67.3 cm)
Size (standalone model)	25.5 high × 19.0 wide × 26.75 long (inches) (64.8 × 48.3 × 67.9 cm)
Weight (rack-mount model)	179 lbs (81 kg) with four tape drives installed
Weight (standalone model)	238 lbs (110 kg) with four tape drives installed

Power

Input voltages	Accepts 100 to 240 VAC at 50 to 60 Hz; automatic input voltage selection
Power consumption (AC true power)	95 watts minimum; 145 watts maximum. Based on the AC true power consumption, the library generates between 325 and 495 BTU/hour.

Power cord requirements

The library is shipped with a 7-foot (2.1 meter), 18 AWG, 3-conductor AC power cord for 120 volt use in the United States and Canada. The power cord has a molded NEMA 5-15P male connector on one end and a molded IEC 320 female connector on the other end. The power cord is UL Listed and CSA Certified.

Other voltages and international use

If you are planning to use an input voltage other than 120 volts AC, or if you plan to use the library outside of the United States or Canada, you must supply your own power cord. Requirements for these power cords follow.

U.S. and Canadian 220 VAC Power Cord

- The power cord must have a molded NEMA 6-15P attachment plug on one end.
- The power cord must have a molded IEC 320 female connector on the other end.
- The cordage must be an SJT-VT type, 3-conductor, 18 AWG minimum.
- The power cord must comply with local electrical code.

International 220 VAC Power Cord

- The power cord must have an attachment plug of the proper type, rating, and safety approval for the intended country.
- The power cord must have an IEC 320 female connector on one end.
- The flexible cord must be harmonized to CENELEC publication HD-21. The electrical characteristics and rating must be minimum H05VVF3G0.75 (6 A).

SCSI terminator specifications

The SCSI terminator must match the SCSI bus configuration (single-ended, LVD, or HVD, and wide or narrow). In addition, all termination must be external. Do not use internal terminators to terminate the library or the tape drives.

To ensure proper performance of the library and tape drives, Exabyte recommends one of the following external terminators:

External terminator specifications		
Narrow	Single-ended	AMP Amplimite 750381-1
	HVD	AMP Amplimite 796051-1
Wide	LVD	AMP Amplimite 796051-1
	HVD	AMP Amplimite 869515-1

Note: For best results on a single-ended bus, use active termination.

Exabyte testing has shown that older passive termination does not provide rising edge transitions that are fast or clean enough at fast SCSI speeds.

SCSI cable specifications

The following table lists the recommendations for external SCSI cables for the narrow SCSI library.

Cable feature	Requirement
Standard Construction	50 conductors (25 twisted pairs with drain wire and shield)
Primary Conductors	Gauge: # 28 AWG minimum stranded (7/34) annealed, tinned copper
	Insulation: Polypropylene (80° C) 0.010 inch nominal
Shielding	80% minimum tinned copper braid over aluminum/mylar foil
Voltage Rating	30 VAC
Impedance	Single-ended: 88 Ohms ± 8 Ohms Differential: 130 Ohms ± 12 Ohms
Grounding	Case-to-case grounding
Connector	50-contact AMP Amplimite 0.050 male, shielded, SCSI-2 connector

For the wide SCSI library, use cables that conform to SCSI-3 specifications.

Cable length for single-ended configurations

If you are using Exabyte Mammoth tape drives and your host can transfer data at more than 5.0 MB per second, the total length of all internal and external cables should not exceed 3.0 meters (9.8 feet).

If your host limits data transfers to 5.0 MB per second or less, or if you are using Eliant 820 tape drives, the total length of all internal and external cables should not exceed 6.0 meters (19.7 feet).

Cable length for LVD/HVD configurations

The total length of all internal and external cables on the SCSI bus should not exceed 12.0 meters (39 feet). In a point-to-point configuration, the maximum allowable cable length is 25.0 meters (82 feet).

Determining the cable length for each bus

1. For each bus, add the lengths of all external SCSI cables.

2. To that total, add the SCSI cable lengths used by the library *for each bus*:

   - For each tape drive, add 28 cm (11 in.) to allow for the cable used by the tape drive inside the library.

   - For each jumper you plan to install on the library to connect sequential devices to the same bus, add 5 cm (2 in.).

   - If you have a wide SCSI library, add 13 cm (5 in.) for the internal cable used by the library itself, and 5 cm (2 in.) for the SCSI jumper cable.

   - In the narrow library, the library and the topmost tape drive use the same SCSI cable. There is no additional cable for the library itself.

Remote reset cable specifications

The remote hardware reset port on the back panel allows you to perform a manual hardware reset on the library to clear hardware errors. This port requires an 8-pin circular DIN connector and a two-wire cable capable of providing momentary contact between pin 1 and pin 2.

Notes

B SCSI Basics

This appendix provides an overview of the *Small Computer System 2* (*SCSI-2*) and gives an overview of how to configure the SCSI bus. SCSI is a standard specification that allows an application running on a host computer to communicate with peripheral SCSI devices, such as the library and the enclosed tape drives. The library uses SCSI commands to receive instructions from the host and to report its status to the host.

SCSI components

The SCSI system consists of the following components:

- **Initiator**. The host computer system acts as the initiator of commands. It consists of the application software, the operating system, the device driver, and the SCSI adapter card.
- **Bus**. The SCSI cables connected to the adapter card and to the library (as well as other devices on the bus) provide a pathway or "bus") for passing commands.
- **Targets**. The library and the tape drives are peripheral devices (or targets) that are capable of receiving commands from the host. Up to eight devices (including the host computer) can be connected to the SCSI bus, in what is referred to as a daisy chain.

Considerations for installing the library on the SCSI bus

This section provides the basic rules and considerations for setting up the library on the SCSI bus.

Single-ended, LVD, or HVD

CAUTION

Do not connect an LVD library to an HVD SCSI bus, you may damage the devices attached to the bus.

Every SCSI device attached to the SCSI bus must be compatible: either single-ended or low-voltage differential (LVD) or all high-voltage differential (HVD). On a single-ended SCSI bus, one signal line is used to transmit a bus signal between devices. On a differential bus, two signal lines are used. If your library is single-ended or LVD, then all devices you install on the SCSI bus must also be single-ended or LVD; if your library is HVD, all devices must be HVD. These other devices include the tape drives installed in the library, the adapter card installed in your host computer, and terminators.

Note: Be aware that if you connect single-ended and LVD devices on the same bus, all devices on the bus operate as single-ended devices.

Narrow or wide SCSI

The narrow library supports Mammoth and Eliant 820 tapes drives. The wide library supports Mammoth tape drives only.

Fast SCSI

The library supports fast SCSI, which does not require any special cabling or configuration. However, proper cable lengths, stub length, and termination are more important on a fast SCSI bus than on a regular SCSI bus.

SCSI cabling

When connecting the library and other devices on the SCSI bus, follow these guidelines for SCSI cabling:

- ✔ Single-ended configurations. If you are using Mammoth tape drives and your host is able to accommodate a data transfer rate of more than 5.0 MB per second, make sure that the total length of all internal and external cables does not exceed 3.0 meters (9.8 feet). If your host limits data transfers to 5.0 MB per second or less, or if you are using the Eliant 820 tape drives, make sure that the total length of all internal and external cables does not exceed 6.0 meters (19.7 feet).

- ✔ HVD/LVD SCSI cable lengths. Make sure the total length of all internal and external cables on the SCSI bus does not exceed 12 meters (39 feet). If you have a point-to-point connection, make sure the total cable length does not exceed 25 meters (82 feet).

- ✔ Internal cabling. You must include the amount of internal cabling in your calculations. See page 149 for information. If you have any other external devices on the bus (not installed inside your host computer), these devices may have some amount of internal SCSI cabling as well.

Termination

If the library or one of the tape drives is the last device on the SCSI bus, you must attach a terminator to the appropriate SCSI connector at the back of the library. The SCSI terminator must match the SCSI bus configuration (single-ended, LVD, or HVD; wide or narrow). Termination can be active or passive. If you are using Mammoth tape drives and your host can transfer data at more than 5 MB per second, use active termination. If you are using Eliant 820 tape drives, or if your host limits data transfer to 5 MB per second or less, use either active or passive termination. For best results on a single-ended bus, use active termination.

Note: Exabyte testing has shown that older passive termination does not provide rising edge transitions that are fast or clean enough at fast SCSI speeds.

SCSI IDs

Each device on the SCSI bus must have a unique ID. The host computer uses these IDs to identify each device. The SCSI ID also determines which device has priority when more than one device is trying to communicate with the host. The lower the ID, the lower the priority of the device.

Note: The SCSI ID does not depend on physical location. For example, the last device on a multi-device SCSI bus can have a SCSI ID of 2.

If you have one tape drive installed, the library uses two SCSI IDs, one for the library itself and one for the tape drive. If you have two drives installed, the library uses three IDs. Separate IDs allow the library and tape drives to operate as independent devices, receiving different sets of SCSI commands from the host.

Notes

C LCD Error Codes

This appendix describes the error codes that appear on the library's LCD (liquid crystal display). LCD error codes do not reflect tape drive errors.

CAUTION

Library components can be replaced only by Exabyte-approved service providers. If you cannot find an obstruction or other obvious cause for the error, contact your service provider. Do not attempt to replace any components in the library other than the tape drives, drive blanks, fuse, or air filters. If you do, you may void your warranty.

For information about SCSI error conditions (sense data), refer to page 100 and to the *EXB-440 and EXB-480 8mm Libraries SCSI Reference*.

CAUTION

Some corrective actions advise you to reset the library. Before resetting, make sure there is no SCSI activity on any connected SCSI bus, so you do not disrupt communications.

The following table lists the library hardware error conditions in numerical order.

Error	Description	Corrective action
10	DROPPED A CARTRIDGE. The CHM dropped a cartridge.	If the cartridge label was removed, make sure that there is no label adhesive remaining on the cartridge. If the label was not removed, contact your service provider. **CAUTION:** Do not try to put the cartridge back in the gripper.
11	SOURCE EMPTY. There is no cartridge in the source location.	Install a cartridge in the source location, or redirect the CHM to another location.
12	DESTINATION FULL. A cartridge already exists in the destination location.	Remove the cartridge from the destination, or redirect the CHM to another location.
13	PUT MECH. FAILURE. The CHM could not successfully place a cartridge because of mechanical problems.	Make sure there is nothing blocking the CHM or the tape drives. If the error persists, contact your service provider.
14	PICK MECH. FAILURE. The CHM could not successfully pick a cartridge because of mechanical problems.	
15	NO SRC ELEMENT; NO DEST ELEMENT. No data cartridge magazine was installed at the selected location.	Install a data cartridge magazine or redirect the CHM.
16		
17	CHM FULL BEFORE MOVE. There was a cartridge in the gripper when the operator powered-on or reset the library, or before a move operation.	Remove the cartridge and put it back in the cartridge magazine if you know where it goes. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error	Description	Corrective action
18	SRC INSIDE DRIVE. The CHM could not successfully pick a cartridge because it was still loaded in the tape drive.	Press the tape drive eject button and wait for the cartridge to be unloaded, or redirect the CHM to another location.
19	PICK MECH. FAILURE. The CHM could not successfully pick from a full cartridge slot.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
21	GRIP HOME ERROR. A gripper error occurred.	
22	GRIP MOTION TIMEOUT. A gripper motion took longer than the maximum time allocated for it. When motion functions do not complete in the allocated time, the current to the servo motors is shut off.	
25	PICK STALL. The CHM stalled while trying to pick a cartridge from the tape drive.	
26	CANNOT OPEN GRIPPER. The gripper could not open.	
30	S AXIS DOES NOT MOVE. The CHM could not move along the short axis.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
31	S AXIS FAILED HOME. The CHM could not return to the home position along the short axis.	
36	S LM629 RESET FAIL. The library could not reset the servo chip for the short axis.	Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error	Description	Corrective action
38	CANNOT LOAD DRIVE. The CHM could not load the cartridge into the tape drive. (It could not move in far enough on the short axis.)	▪ Open the door and look for anything that might be obstructing the CHM along its short axis. ▪ Make sure that a cartridge is not already loaded in the tape drive. ▪ Make sure that the flap on the cartridge is closed. ▪ Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
40	L AXIS DOES NOT MOVE. The CHM could not move along the long axis.	Open the door and look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
41	L AXIS FAILED HOME. The CHM could not return to the home position on the long axis.	
46	L LM629 RESET FAIL. The library could not reset the servo chip for the long axis.	Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
50	D AXIS DOES NOT MOVE. The drum could not move on its axis.	Open the door and look for any obstructions around the drum. If there are no obstructions, contact your service provider.
51	D AXIS FAILED HOME. The library could not determine the home position for the drum.	Contact your service provider.

Error	Description	Corrective action
60	NO LABEL. The bar code scanner could not read the bar code label because there was no label on the cartridge.	If present, this error appears on the Label Info screen. If the cartridge does not have a label, place a label on the cartridge. If the cartridge does have a label, reposition or replace it. If the error persists, contact your service provider.
61	READ ERROR. The bar code scanner could not read the bar code label because the label was unreadable.	
62	NOT PRESENT. The bar code scanner could not read the bar code labels because there was no data cartridge magazine present.	If present, this error appears on the Label Info screen. If necessary, install a data cartridge magazine.
65	DMA OVERRUN. The bar code scanner could not read the bar code label because a Direct Memory Access overrun occurred.	If present, this error appears on the Label Info screen. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
67	DMA CH. 2 TIMEOUT. Controller board error.	
69	LABEL UPSIDE DOWN. The bar code scanner could not read the bar code label because the label is upside down.	If present, this error appears on the Label Info screen. Remove the label and reposition it on the cartridge. If the label is affixed correctly, contact your service provider.
70	L SERVO TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door and look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error	Description	Corrective action
71	PARAMETER > LIMIT. Firmware error.	Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.
72	FRONT DOOR OPEN. The front door is open or the door solenoid is malfunctioning.	▪ Close and lock the door. ▪ If the error still appears, make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. ▪ If the error persists, contact your service provider.
73	S SERVO TIMEOUT. The CHM could not reach its destination along the short axis.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
75	INTERNAL S/W ERROR. Firmware error.	Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a Diagnostic listing, and you may need new firmware.
76	POS ERROR TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door and look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.

Error	Description	Corrective action
77	INTERFACE DISABLED. The library was not in the correct control mode when the operator sent a command.	Make certain the library is in the correct control mode. If it is, contact your service provider.
80	E/E FAILED TO EXTEND. The entry/exit port could not be extended.	Open the door and look for obstructions around the entry/exit transport arm. If there are no obstructions, contact your service provider.
81	E/E FAILED TO RETURN. The entry/exit port could not be retracted.	
90	INVALID BLANK CONFIG. The drive blank configuration is invalid.	This error applies to earlier models of the library only. If you operate the library with fewer than four drives, you must have drive blanks installed in the empty slots. Tape drives must be installed in contiguous slots, starting with the top slot.
91	OPERATOR ABORTED. A diagnostic was aborted while it was in progress.	No corrective action required.
97	DRIVE NOT INSTALLED. The tape drive could not be cleaned because no tape drive is installed in this location.	This error only appears on the Clean Drives Menu. If no tape drive is installed in the location, redirect the CHM. If a tape drive is installed, make sure that the drive carrier is correctly seated. If the error persists, contact your service provider.
98	NO MAGAZINE. There is no magazine installed in this location.	If no magazine is installed in that location, redirect the CHM. If a magazine is installed, make sure that it is correctly seated on the mounting plate. If the error persists, contact your service provider.

Error	Description	Corrective action
101	DRUM MOVE, SAXIS EXT. The CHM could not move along the short axis.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
104	DRIVE DID NOT EJECT. The CHM timed out waiting for a tape drive to eject a cartridge.	There may be a problem with the tape drive. Contact your service provider.
105	480 KEY NOT PRESENT. The library is missing the hardware key. (This error applies to the Exabyte 480 only.)	Reseat the hardware key on the controller card at the rear of the library. Make sure the library and tape drives are not being used by any host, then press Reset. If the error persists, contact your service provider.
108	INVALID BOOT ROM. The installed boot ROM is not compatible with the flash EEPROM code.	You do not have the correct boot ROM for the firmware you are trying to run in your library. Contact your service provider.
109	CHECK CLEANER. The cleaning cartridge was ejected immediately after being loaded into the tape drive.	Replace the cleaning cartridge and try cleaning the tape drive again. Make sure you are using the correct type of cleaning cartridge for your tape drive. If the error persists, contact your service provider. **Note:** This error is only displayed if the cleaning was requested from the LCD.
115	EMPTY DRIVE SLOT. There is no tape drive in this drive slot.	Make sure that all tape drive slots have either a tape drive or a drive blank installed.

Error	Description	Corrective action
130	FAS216 ERROR; SCSI UNEXPECTED INT; SCSI INT STUCK ERROR. There is a SCSI chip failure.	Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a Diagnostic listing to for diagnosis, and you may need a new controller card.
131		
132		
133		
134		
135		
136		
137		
190	HIT CART IN DEST. The CHM performed a move that caused a cartridge collision.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
191	Mammoth & 85XX. You have installed a Mammoth tape drive and an Eliant 820 tape drive in the same library.	You cannot mix Mammoth and Eliant 820 tape drives in the same library.

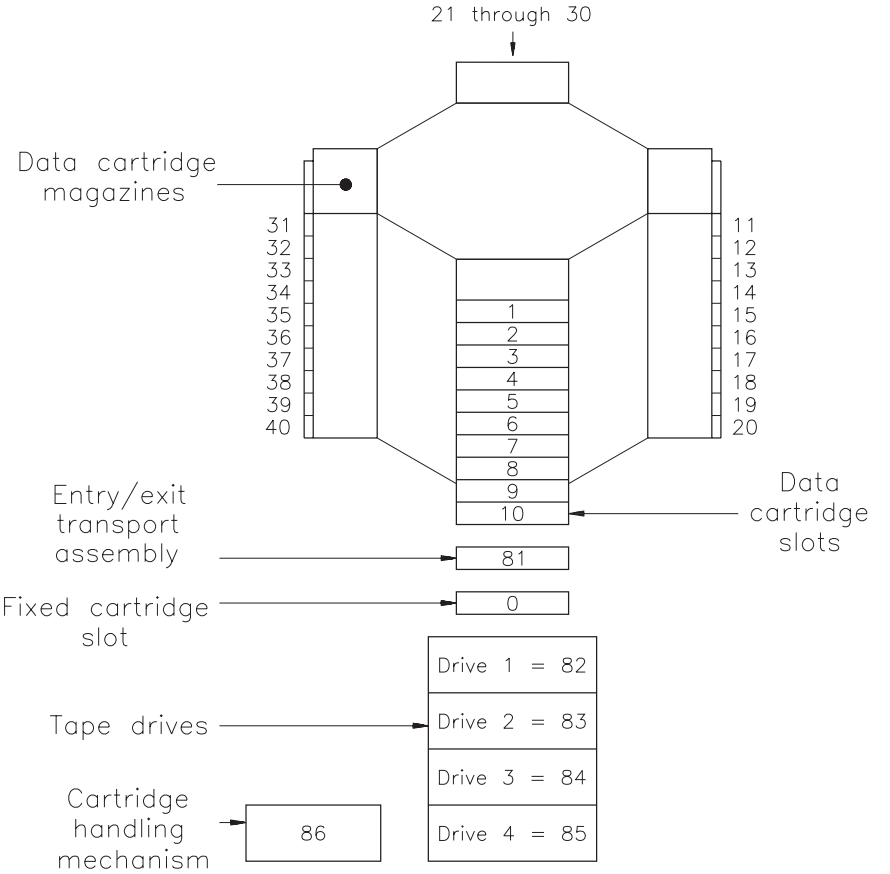
D Library Elements

Elements are the physical locations in the library that can accept a cartridge (the CHM, the magazine slots, the fixed slot, and the tape drives).

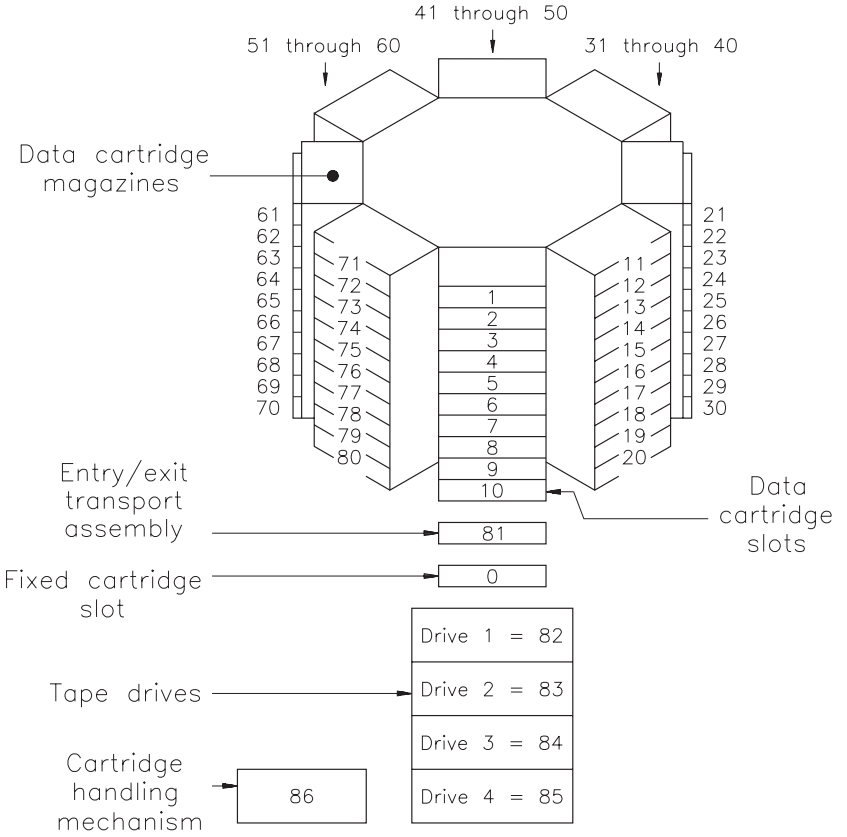
Each element has an element index, which enables the library to identify the elements. Many LCD functions require you to use element indexes.

The following figures show the element indexes for the Exabyte 440 and the Exabyte 480.

Exabyte 440


21 through 30
Data cartridge magazines
31
32
33
34
35
36
37
38
39
40
11
12
13
14
15
16
17
18
19
20
1
2
3
4
5
6
7
8
9
10
Data cartridge slots
Entry/exit transport assembly
81
Fixed cartridge slot
0
Drive 1 = 82
Drive 2 = 83
Drive 3 = 84
Drive 4 = 85
Tape drives
Cartridge handling mechanism
86

Exabyte 480


41 through 50
51 through 60
31 through 40
Data cartridge magazines
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
Entry/exit transport assembly
81
Data cartridge slots
Fixed cartridge slot
0
Drive 1 = 82
Drive 2 = 83
Drive 3 = 84
Drive 4 = 85
Tape drives
Cartridge handling mechanism
86

Notes

E Packing and Shipping the Library

This appendix describes the procedures for:

- Returning the library for service
- Packing the library

Returning the library for service

If you need to return the library to the factory for service, contact your service provider. If your service provider instructs you to return the library directly to Exabyte, contact Exabyte Direct Sales to obtain a Return Materials Authorization (RMA) number and the shipping address (see page 10). When you have the RMA number, follow the shipping instructions on the following pages.

➤ **Important** If you are returning the library for service, remove and keep all cartridges, cartridge magazines, SCSI cables, terminators, jumpers, power cables, and keys.

Packing the library

Use the original packing materials to pack the library (shipping containers, packing foam, and antistatic bag). You will also need packing tape and banding material.

> **CAUTION**
>
> To avoid damaging the library and voiding your warranty, be sure to use the original shipping materials (or replacement materials obtained from your vendor) when repacking and shipping the library. Do not use the shipping carton and packing materials to ship items other than or in addition to a library.

Preparing the library for shipping

To prepare the library for shipping:

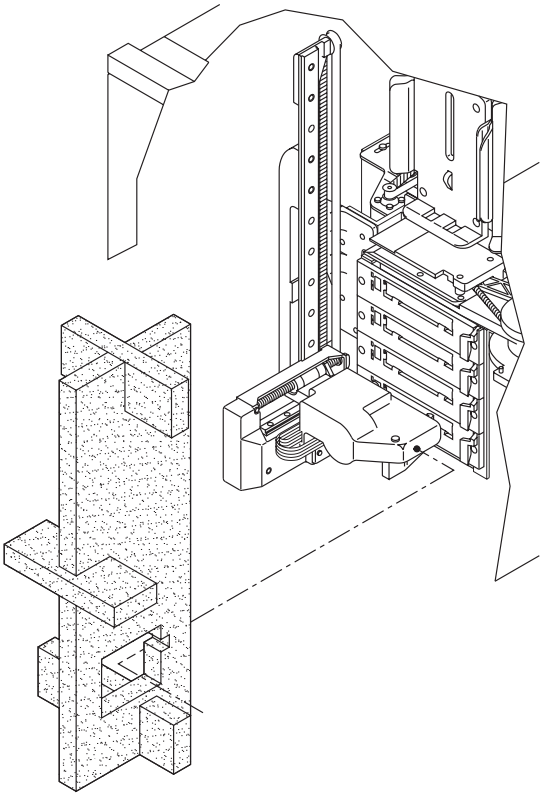
1. Remove all the magazines from the library. Make certain the CHM gripper and the tape drives do not contain cartridges.

2. Power off the library.

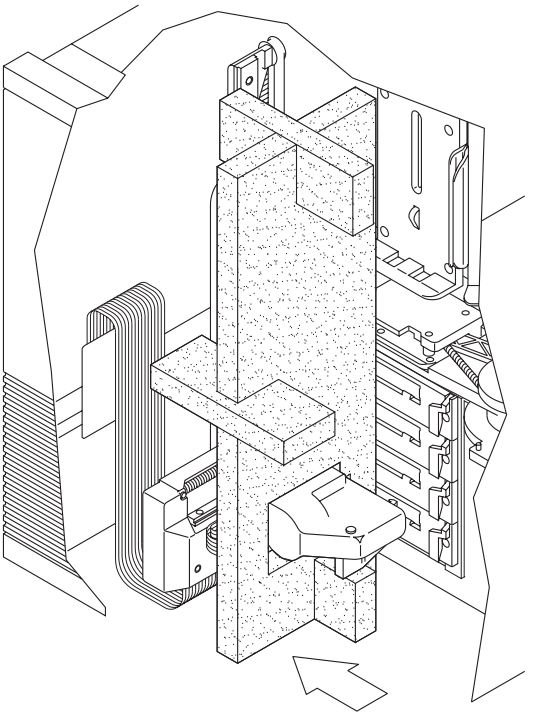
3. Remove the power cord, the SCSI cables, and any terminators or jumpers. Do not ship these items if you are returning the library to the factory.

   Note: If you need to ship these items, pack them in the accessories box.

4. Insert the packing foam next to the CHM, as shown in the following figure.



5. Adjust the packing foam so the CHM fits into the pocket, as shown in the following figure.



6. Close the library door and lock it. Remove the key.

➤ **Important** If you are returning the library for service, keep the key. When the library is returned to you, the door will be locked.

Accessing the standalone model handles

To lift the library, you must access the handles located underneath the side panels. To remove the side panels:

1. Using a flat-blade screwdriver, loosen the four captive screws at the back of the library (two captive screws for each panel).

2. Pull each panel back and away from the library (see page 15).

Removing the rack-mount model from the rack

WARNING!

The rack-mount library weighs 137 – 179 pounds (62 – 81 kg); the standalone library weighs 190 – 238 pounds (86 – 110 kg).

You need at least 4 people, or 2 people and a small fork lift, to lift either model.

Obtain the following tools

- A fork lift and one additional person or yourself and at least three additional people
- T-15 TORX driver
- T-25 TORX driver

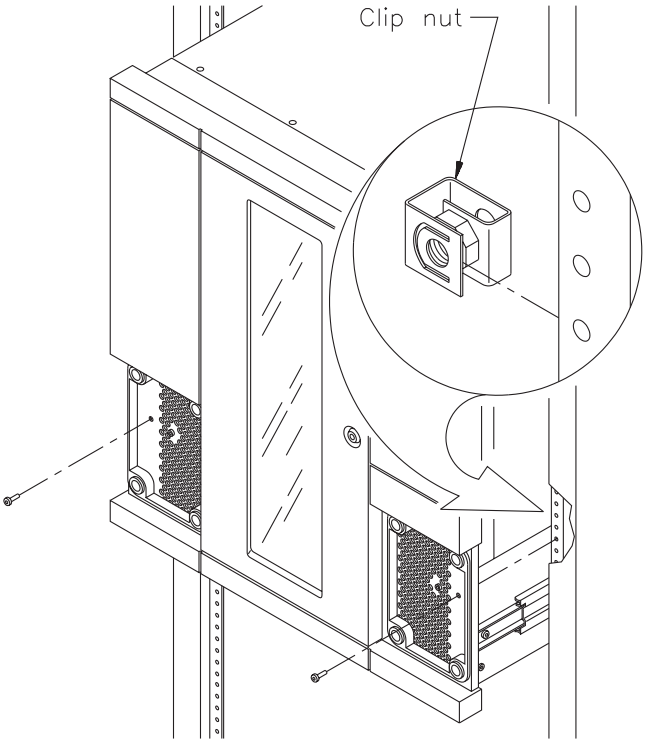
Removing the library

To remove the library from a rack:

1. Extend the extension support legs on the rack.

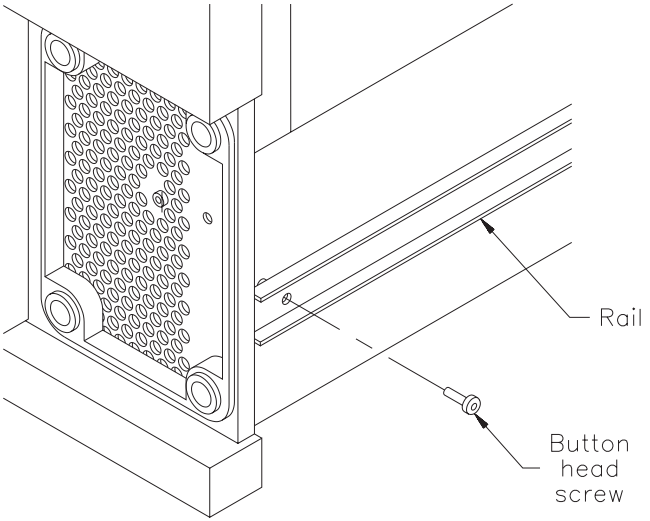
2. Remove the air filter grilles from the front of the library by lifting on the outside edges and pulling the grilles away from the library.

3. Use a T-25 TORX driver to remove the two pan head screws that secure the library to the rack, as shown in the following figure. (A clip nut may have been installed over the screw hole on the rack.)

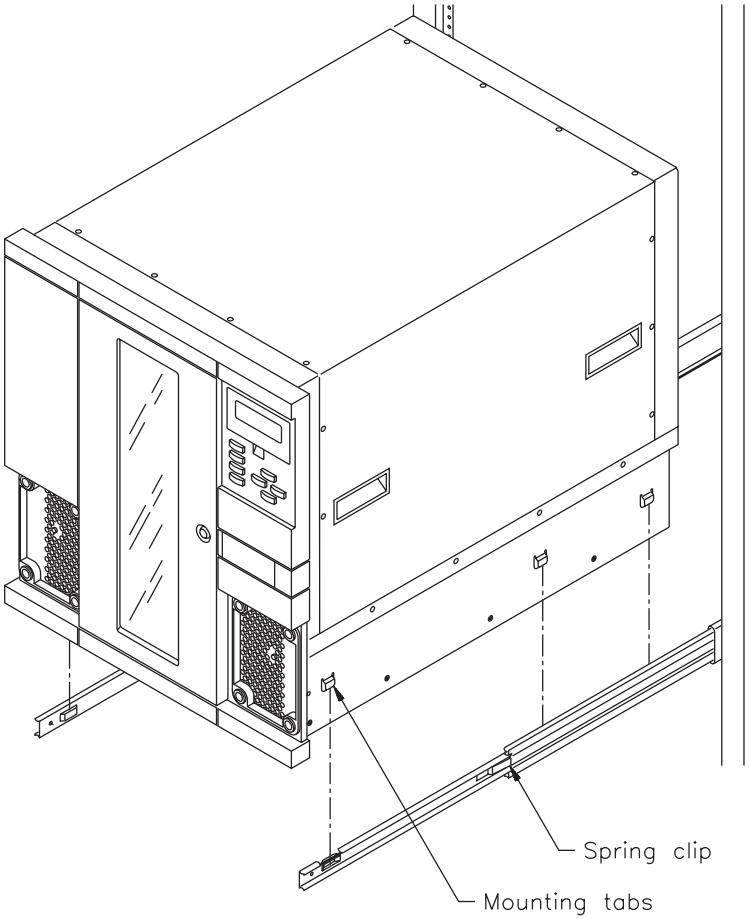


4. Slide the library a few inches out of the rack.

5. Use a T-15 TORX driver to remove the two button head screws attaching the rails to the sides of the library, as shown in the following figure.



6. Making sure the library is supported so that the rack will not tip, slide the library forward until the rails stop at the spring clips (see the following figure).



7. Lift the library from the rack and lower it to a low workbench or the floor.

8. Replace the air filter grilles on each side of the front panel.

9. Press the spring clips on the rails and push the rails back into the rack.

Packing the library

WARNING!

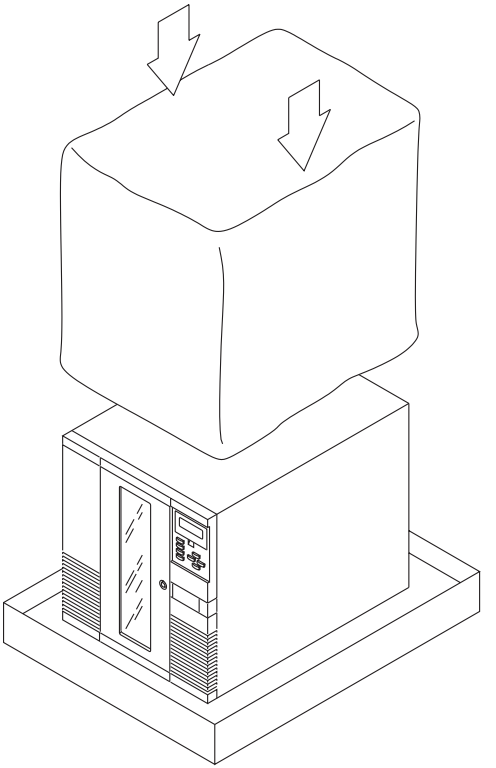
The rack-mount library weighs 137 – 179 pounds (62 – 81 kg); the standalone library weighs 190 – 238 pounds (86 – 110 kg).

You need at least 4 people, or 2 people and a small fork lift, to lift either model.

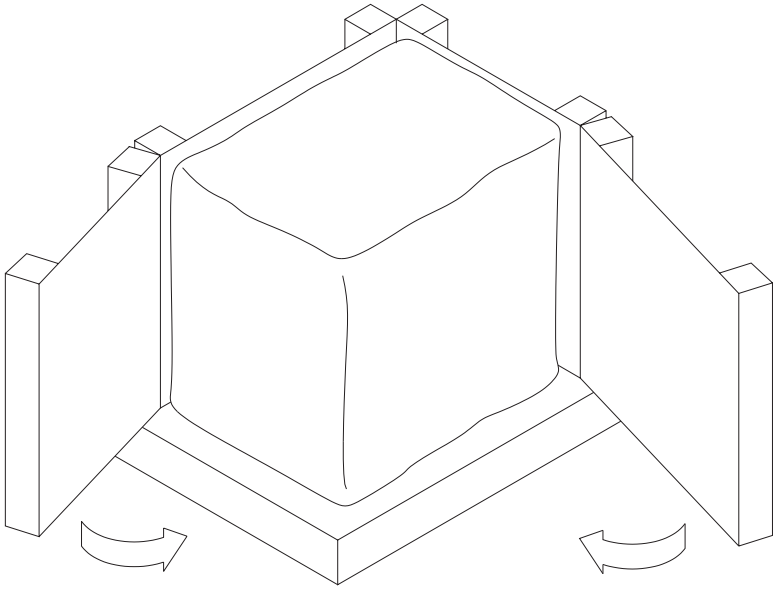
1. Lay the bottom packing cushion over the tray, which is stapled to the pallet.

2. Using four people, or two people and a fork lift, place the library on top of the bottom cushion.

3. Place the antistatic bag over the library as shown in the following figure.



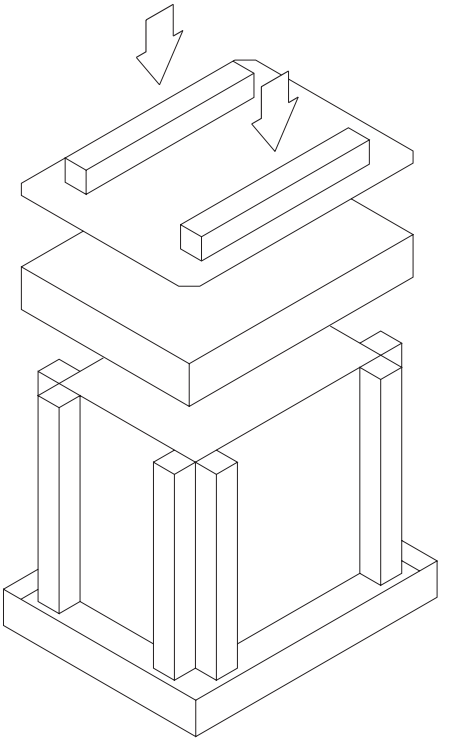
4. Place the cushioned packaging around the library, as shown in following figure. (Use the alignment holes in the packing pieces as a guide.)



5. If you are shipping the library's accessories, place the accessory box on top of the library, as shown in the following figure.

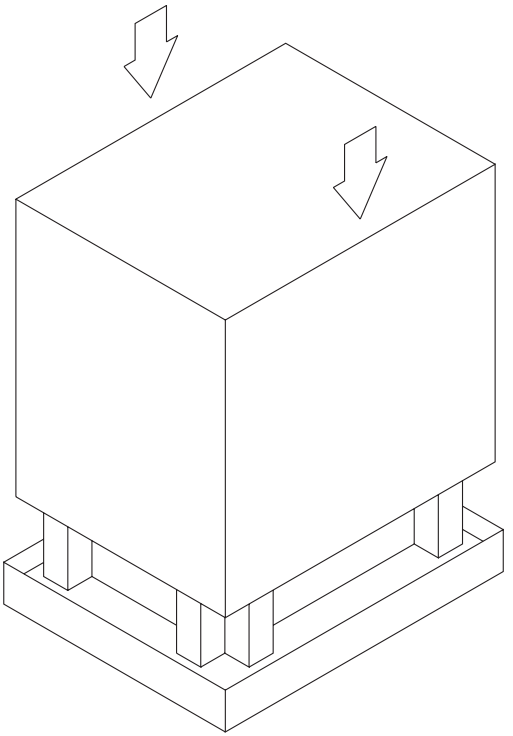
➤ **Important** If you are returning the library for service, do not return the library's accessories (cartridges, cartridge magazines, SCSI cables, terminators, jumpers, power cables, and keys).

6. Place the cushioned top over the accessory box, as shown in the following figure.



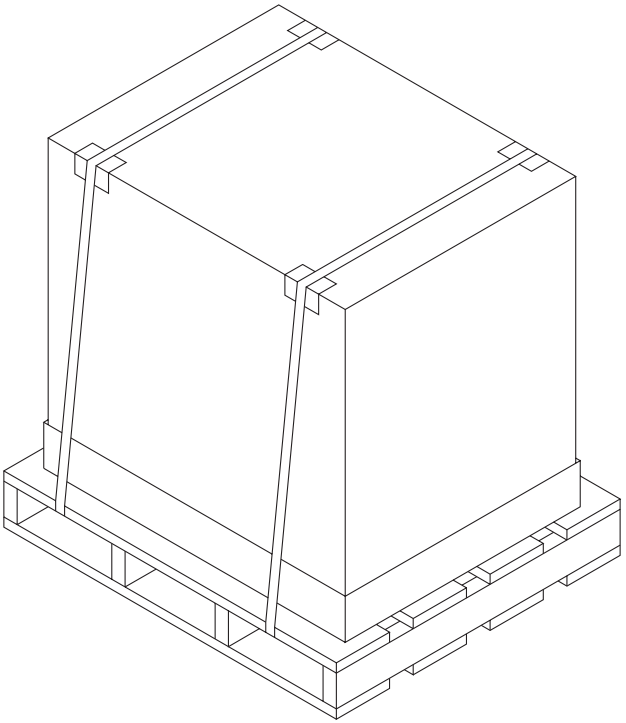
7. Lay the necessary paperwork on top.

8. Place the carton over the library, as shown in the following figure, and tape the box shut.



9. Place the shipping label on the box.

10. Secure banding material around the box and through the wooden pallet, as shown in the following figure.



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